INDEX TO BLISTER RUST REPORT FOR FAR WEST, 1919.

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WHITE PINE BLISTER RUST WORK IN THE FAR WEST, SEASON 1919.

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SUMMARY OF WORK TO SPRING, 1919.

White Pine Blister Rust work in the far western states was begun in the spring of 1917, and comprised the following:

1. Inspection of stock in nurseries.
2. Location and inspection of pines shipped in from dangerous territory.
3. Locating and inspecting Ribes shipped in from dangerous sources.
4. Scouting for the disease on native pines and Ribes.

The territory was divided among the western branch Forest Pathological offices as follows:

J. R. Weir. Missoula office: Spokane and Pend Oreille Counties, Washington. Montana, Idaho, Wyoming and the Block Hills of South Dakota.

E. P. Meinecke. San Francisco office: California, Nevada, Utah, Oregon and Washington, except the two northeast counties.

W. H. Long. Albuquerque office: Arizona, New Mexico, Texas, Oklahoma and Arkansas.

G. G. Hedgecock. Washington office: Colorado.

The situation in the Far West was as follows: Large amounts of nursery stock consisting of Ribes and five-leaf pine

had been shipped to nurseries within the territory. These shipments had come from all over the world. And in many cases, from nurseries or localities known to be infected with the white pine blister rust. Many of these plants had been re-shipped to points lying within or immediately contiguous to areas containing five-leaf pines.

The Pacific Coast and Northern Rock Mountain States, having a wide range to climates congenial to the growth of trees and shrubs had given rise to the greater number of nurseries handling such plants. In this region also is found the entire range of the sugar pine and western white pine. These two species include all of the commercial western five-leaf pines. In consideration of the above factors, the work in this territory had naturally consisted of first locating and inspecting imported hosts of the disease.

The southwestern Rocky Mountain State and southern Great Plain States are in general comparatively arid with a range of climatic factors unfavorable to imported pines and Ribes. Consequently, except in small areas, the shipment of dangerous material into these regions had been meager, and plants which were shipped in usually failed to become acclimated. The above facts greatly reduced the preliminary survey of nurseries and enabled the progress of the work to develop in to scouting on native hosts. The five-leaf pines indigenous in this territory have comparatively wide ranges at high altitudes, but are not

of important commercial value. Blister rust work was warranted in these regions because of the probability that if the disease became established in any part of them, it would gradually work westward through an unbroken chain of native hosts to the sugar pine or western white pine region.

SUMMARY OF WORK, SEASON - 1919

INTRODUCTION.

Beginning July 1, 1919, blister rust work for all of the above states except South Dakota and Arkansas was brought together under one field office. This office was established at San Francisco until August 8 when it was moved to the University of California, Berkeley, California. A study was made of methods used in the several districts for conducting field work and recording observations. Conferences were held with each district chief to obtain additional ideas concerning the work in general. With a working knowledge thus obtained, plans were made for continuing the work in the whole territory.

Work in the several districts had been conducted in the past along different lines. Since at the time the territory was taken over progress for the present season was already under way, it was decided to continue the work without alteration in the various districts for the time being and gradually make such changes as were necessary to unify it for the entire territory. In this regard it was realized that any abrupt change in the plans in any particular dis-

trict would have temporarily disorganized the work already in progress.

STATEMENT OF PROBLEM

The territory comprises states listed below, and will be referred to as "The Far West." Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oklahoma, Texas, Utah, Washington and Wyoming.

Blister Rust Control work in this territory is based primarily upon two factors. (1) The White Pine Blister Rust may have been introduced into one or several localities on shipments of diseased plants, either five-leaf pines, or gooseberry and currants. (2) The disease may yet be introduced into one or many localities on shipments of diseased plants, either five-leaf pines, or gooseberry and currant.

The object of white pine blister rust work will be to stamp out to the last trace any infection on Pines or Ribes species that might be found and to prevent by all means the introduction of the disease into the territory.

It is known that the disease is not indigenous in this territory and that it could only come in through importation of infected plants from the outside, principally from Europe, the Eastern States (east of the west border of Minnesota, Iowa, Missouri, Arkansa and Louisiana) Canada, British Columbia and Japan.

Blister Rust carriers are of two kinds: (1) Absolutely dangerous-five-leaf pines. (2) Potentially dangerous - any gooseberry or currant plant. Therefore, the work is logically divided under the following heads:

Prevent Further Introduction of Host Plants - By assisting State officials in making quarantine measures effective.

Inspection of Imported Plants:

1. All imported five-leaf pine and gooseberry and currant plants should be located.
2. All imported plants should be run down and inspected in the order named:
    a. Five-leaf pines from infected sources.
    b. Five-leaf pine from suspicious sources.
    c. Gooseberry and currant plants from infected sources.
    d. Gooseberry and currant plants from suspicious sources.

Scouting Native Plants: Scouting for the disease on both native five-leaf pines and native Ribes in localities where blister rust carriers have been planted.

The territory is entirely too extensive to permit a plant-to-plant inspection of all the native five-leaf pines and Ribes. However, as importations are followed up, every advantage should be taken to inspect native plants whenever they are found in local-

ities where dangerous material has been planted.

ARRANGEMENT OF STATES.

Relative importance of immediate work in the various states was tentatively decided after considering the following points:

1. Number of five-leaf pines and Ribes plants shipped in from dangerous sources.
2. Location of these plantings with reference to five-leaf pine ranges.
3. Relative abundance of wild Ribes in sections where dangerous material has been planted.
4. Planting centers outside of five-leaf pine areas, but which are connected with such areas by unbroken chains of Ribes.
5. Seasonal climatic variations which would tend to check or assist the rapid spread of the disease.
6. The presence of an unidentified Cronartium on Ribes.

In accordance with the above factors the following arrangement was made: California, Idaho, Montana, Washington, Oregon, Utah, Arizona, Nevada, Wyoming, New Mexico, Colorado, Texas, Oklahoma.

ASSIGNMENT OF MEN.

All men employed were not of equal value for all types of work. Since the nature of work in any state would change from time to time, most of the men were authorized to travel in all states in the territory in order to facilitate quick transfers when necessary.

Northwest: In order to assist new men in the work, Mr. Chas R. Stillinger was given field supervision in the states of Oregon, Washington, Idaho, Montana and Wyoming. The following men were assigned to work in those states: Burr N. Prentice, Wm. E. Morgan, Fred G. Renner, Walter H. Lankenau, Lloyd Graham and Chas. D. Meissner.

California: The discovery of a Cronartium in southern and central California made it necessary to do extensive scouting in the state. Mr. Henry N. Putnam, Mr. George A. Root, Mr. Harlan R. Wilson, Mr. Chas. E. Randall and Mr. Stephen N. Wyckoff were assigned first to work in California and then Nevada. Later Mr. A. O. Garrett was also called in to assist in scouting in California, and Mr. Meissner was assigned to nursery inspection in the state.

Utah: Utah is the nursery center of that section and much imported stock has entered the state. Mr. A. O. Garratt was assigned to work in that state.

Arizona and New Mexico: There is a wide distribution of both five-leaf pines and Ribes in these states which are thought to lead in practically unbroken chains to the Sugar pine districts of California. L. N. Goodding, and H. A. Auxier were assigned to work in those states.

Colorado Texas Oklahoma: Due to the relative unimportance of these states as blister rust danger points, no men were assigned to work there during the season of 1919.

TRACING AND INSPECTING SHIPMENTS.

Records: Records showing the distribution of pine and Ribes shipments were filed according to states, counties, and towns or post offices. These shipments were classified in order of their importance as blister rust carriers according to their origin. Pine shipments were placed first on the list to be inspected.

Preliminary Survey: Past experience showed that many of these plantings were set out in unsuited sites and had died. Much time and expense was saved by the use of form letters of inquiry, the reply to which included statements regarding the present health of the plants and notes on their exact locations. This work was done in the central office before giving the records to field men.

Inspection: Records for a locality were furnished to the field man together with a tentative itinerary. When he arrived at town he examined his records noting whether or not the exact address or location of each planting was given. In cases where the address was not definite, acting in accordance with paragraph 4, page 63, annual postal guide of 1917, he would obtain such additional information as was needed at the post office. The records for the town or locality were then arranged according to streets, roads, etc., and the most expedient means of reaching the various points selected. The inspections were then made.

Picking up Unrecorded Plantings: As the inspections were made, special attnetion was given to making inquiries concerning other plantings

of imported pines or Ribes, and visiting city parks, cemetaries, etc., where such plants were likely to be found. These were also inspected.

Scouting Native Plants in the Vicinity: Realizing the possibility that the disease had been brought in on shipments and had escaped to wild plants in the vicinity, each inspector was instructed to examine native pines and Ribes in a community while following up shipments.

SCOUTING NATIVE PINES AND RIBES.

The discovery of a Cronartium in California in a nursery which had been visited by Blister Rust scouts in the seasons of 1917 and 1918 was given serious consideration. This nursery had been reported free of such diseases during the two preceding seasons when undoubtedly it occurred in the vicinity as one of the local horticultural inspectors had observed it on wild Ribes four years previously. This instance, together with knowledge of similar experiences of men working on blister rust in the East were convincing of the fact that such scouting as would be done in the course of running down plant shipments was not sufficient to give an accurate account of what occurred on native plants.

Field men then engaged in tracing and inspecting shipments were instructed to give more attention to wild plants in localities as they inspected plantings, and it was decided to keep some men in the field constantly scouting wild plants.

Selection of Territory to be Scouted: Areas to be extensively scouted were selected after considering the following factors:

(1) Amount of plants shipped in from dangerous sources.

(2) Distribution and abundance of native hosts.

(3) Seasonal temperature and moisture as favoring spread of disease.

(4) Cronartium on Ribes known to be present.

Preliminary Survey of Selected Area: Areas that were selected for one of several of the above reasons were then given a preliminary study and the details arranged as necessitated by the following points:

(1) Distribution of host plants as given by all available books.

(2) Topographic features.

(3) Natural barriers.

(4) Connecting links from other areas.

(5) Methods of travel.

(6) Time element.

Guide Maps: U. S. Topographic sheets were most satisfactory when supplemented by maps of larger areas.

Scouting Units: Topographic sheets were divided by lines into smaller units, usually two minutes for rough country, while larger units were desirable in flat country which was not heavily timbered.

Field Notes: The attached field note form was used. These reports were sent into the central office at the end of each week's work.

Cronartium, Sou. Calif. Map S. D. Fernando

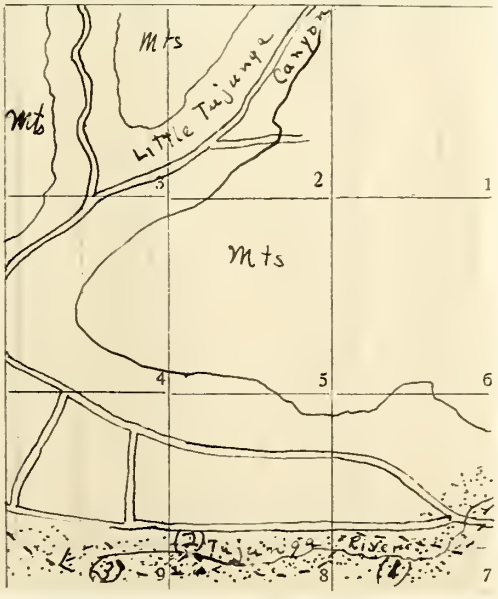
County Los Angeles Scale 1/62500 Square E 7

Locality Tijunga valley, Prev. susc. sp. Init.

In river wash. A continuation westward from E 7 to D-7 R. grac. XX Gr. speciosa - 1 bush HH.P.

No.	Sp.	Topography	Wild Cult.	Inf. %	Spore Form	Date	Scout
1	R. graciliman 10 bushes	1/2 mile below bridge, south side of dry stream bed in shade of willows. Sub square 7	W	1%	Uredo	6/19	HH.P
2	R. grac. 2 bushes	South side of road to Pasadena near oak tree. Dry, 50% shade of willow. Sub. sq. 8	W	0	—	6/19	HH.P
3	Gr. speciosa 1 bush	Near large boulder. Full sunlight. Dry. Sub. sq. 9	W	0	—	6/19	H.H.P.

Remarks



Methods of Transportation: The means of travel in any particular area could only be determined by the field men as they encountered the various sets of conditions. In general, the cheapest and most expedient means adaptable to the locality were used. The following are descriptions of instances warrenting the use of various methods of transportation.

Cultivated Areas with Trolleys or Stage Line: In agricultural communities provided with trolleys or stage lines such public carriers were used. The various scouting points being reached by short jumps.

Good Roads, no Stage or Trolley: In communities provided with good roads, but where there were neither trolley nor stage lines, automobiles were hired by the day, trip or on a mileage basis. In some sections it was found convenient to take advantage of gratuitous transportation. In this connection a machine was used to reach a starting point. The men scouted through the day and by reaching the main highway in the afternoon were usually able to "bum" a ride back to a point where accommodations for the night were obtainable.

Rough Country, Trail Only: In country without travelled roads, scouting on horseback was the most satisfactory means of doing the work. Usually a horse and saddle was obtained at the rate of $1.50 per day.

Rough Country Near Summer Resorts: In the vicinity of mountain resorts, certain stage lines operate a monoploy on means of transportation. And likewise, the resort companies control lodging facilities, making scouting work impossible from a financial point of view. To overcome these conditions it was necessary to organize scouting parties and equip them with camping cafilities enabling them to vary their daily schedule as the nature of the surrounding country might necessitate. In this connection an automobile carrying camp equipment was successfully used in the Yosemite National Forest and adjacent country. (Note: It is estimated that the cost was reduced 75% daily with 50% saving in time.) Pack outfits have been used in Arizona but since the party only consisted of one man and the animals were hired at the rate of $3.00 per day, it is not considered that the amount of work done on the trips was especially worthy of the expenditure. However, when parties of several good scouts can be organized for work in otherwise inaccessible country small pack trains can be used economically to good advantage.

Territory Covered: Scouting for the past season is discussed in the reports of the various states where such work was done.

HOST PLANTS.

Range and Abundancy.

It was realized that accurate data on the range and abundance of both five-leaf pines and Ribes species should be at hand in order

that (1) intelligent schedule might be made for field men (2) a quick estimate of situation might be made in the event white pine blister rust were found.

Collecting Data: From Publications: All available botanical and forestry manuals and various maps giving distribution of the various pine and Ribes were studied. From this data maps for immediate use were prepared. The above information is only general and is considered useful only until more accurate data can be obtained.

From Field Observation: Each scout, as he went about his work for the season, was requested to make field notes on distribution and abundance of all native five-leaf pines and Ribes observed. Description of site conditions attending the various localities were also made. Specimens were collected and sent to the central office where they were identified and the information properly brought forward on the state distribution maps.

During the season, many sets of Ribes have been received which are as yet undetermined. These will be sent to specialists this winter and when correct determinations are received the information will be entered upon host-distribution maps of the various states.

PERSONNEL

The following persons have been employed on Blister Rust Control work in the Far West since July 1, 1919:

	NAMES	TITLE	PERIOD OF SERVICE.
	Auxier, Herschel A.	Field Assistant	July 1 - Sept. 24, 1919
	Blatchley, Rhoda	Clerk	do - Sept. 11, 1919
*	Bridges, Naomi	do	Oct.27 - Permanent
	Garrett, Albert O.	Field Assistant	July 1 - Sept. 15, 1919
*	do	Collaborator	Sept.16 - Indefinite
*	Goodding, Leslie M.	Field Assistant	July 1 - Pending Cert.
	Graham Lloyd	Ass't. in W.P.B.R.	July 1 - Dec. 25, 1919
	Howell, Edna D.	Clerk	July 1 - Nov. 15, 1919
	Lankenau, Walter H.	Field Assistant	July 1 - Sept. 19,1919
	Meissner, Chas. D.	do	July 1 - Sept. 30,1919
	Morgan, Wm.E.	Ass't. in W.P.B.R.	July 1 - Sept. 23,1919
*	Posey, Gilbert B.	Scientific Ass't. in Plant Pathology	July 1 - Permanent
	Prentice, Burr N.	Field Assistant	July 1 - Sept. 12, 1919
*	Putnam, Henry N.	Ass't. in W.P.B.R.	July 1 - Probationary
	Randall, Chas. E.	Field Assistant	July 1 - Sept. 24, 1919
	Renner, Fred G.	do	July 1 - Sept. 25, 1919
*	Root, Geo. A.	Ass't. in W.P.B.R.	July 1 - Probationary
*	Stillinger, Chas.R.	Scientific Ass't. in Plant Pathology	July 1 - do
	Wilson, Harlan R.	Field Assistant	July 1 - Nov. 15 (?)
*	Wyckoff, Stephen N.	Assistant Pathologist.	July 1 - Permanent.

(*) Still engaged on Blister Rust Control work in the Far West.

REPORT OF WORK, SEASON OF 1919

A report of the season's work done in each state follows in the order named:

California,	Utah,
Idaho,	Arizona,
Montana,	Nevada,
Washington,	Wyoming.
Oregon,	New Mexico.

Note: No Blister Rust work was done in Colorado, Oklahoma and Texas, except a few days'scouting by Mr. Posey.

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A REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN CALIFORNIA.

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INTRODUCTION.

Summary of Work 1917-1918: The blister rust control work done in California prior to spring, 1919, consisted chiefly in the accumulation of data concerning importation of five-leaf pines and Ribes from sources which might be directly or indirectly dangerous, and the inspection of as many of these plants as possible.

Information concerning importations was gathered from the following sources:

1. Records of the Department of Agriculture at Washington, D.C.
2. Records from Forest Pathology offices in other districts.
3. Custom house records.
4. State horticultural records.
5. Custom house brokers, and nursery invoices and sales slips.
6. Berry growers associations.
7. Information picked up in the field.
8. Answers to form letters of inquiry.

This work has resulted, to date, in the gathering of approximately 8500 records of Ribes and five-leaf pine plantings in the state.

The inspection of cultivated Ribes and pines followed the obtaining of the records. The northwestern coast region, the San

Francisco Bay country, and southern California were thoroughly covered. Not all the plantings in the Sacramento and San Joaquin Valleys were inspected.

Form letters were sent out to growers of Ribes and five-leaf pines to ascertain the health of these plants. In every case, a copy of Farmer's Bulletin No. 742 was enclosed. By the replies to these form letters, it was possible to temporarily eliminate many inspections, as in numerous cases it was reported that the plants had died from drouth, or other causes. Prior to the season of 1919, considerable knowledge had been gained of the plantings of Ribes and five-leaf pine in the state. A majority of the plantings considered to be of dangerous origin had been inspected, and no infection had been found.

INSPECTION OF NURSERIES AND IMPORTED PLANTINGS.

The inspection of imported stock in nurseries and plantings, for the season of 1919, was done by Mr. Randall and Mr. Meissner. This work consisted of:

1. Inspection of imported stock still in nurseries.
2. Searching nursery records for additional information concerning plantations.
3. Inspection of all known plantings of five-leaf pines in the state.
4. Inspection of Ribes known to have come from dangerous sources.

Nursery Inspection and Records: A total of 80 nurseries were inspected in California during the season of 1919. Of these, 13 had handled considerable pine or Ribes stock, and had invoices and sales slips in condition so that record cards could be made from them. There were 31 nurseries which had never handled pine or Ribes stock. There are many such nurseries in California, handling only deciduous fruit trees. Nineteen nurseries were found to have imported pines or Ribes from outside the state, but, being smaller concerns, had kept no records either of importations or sales. In such a case, all that could be done was to inspect the stock found in the nursery, and to obtain such verbal information as was possible from the owners. In most cases this was very meager. Seventeen nurseries were found to handle pines or Ribes, but only from local sources, not to be considered dangerous.

Five-leaf Pine Inspections: During the season of 1919, inspections of five-leaf pines were made in California to the number of 98. These inspections were made in 19 counties, as follows:

San Diego	5	Sacramento	2
Los Angeles	43	Monterey	4
Santa Barbara	8	Santa Cruz	2
San Luis Obispo	2	Santa Clara	6
Kern	1	San Mateo	5
Fresno	4	Alameda	1
Merced	1	Marin	2
Stanislaus	1	Eldorado	1
San Joaquin	2	Glenn	1
Humboldt	2	Butte	4
Sonoma	1		

In no case was any infection of peridermium found on these pines.

Ribes Inspections: During the season of 1919, a total of 61 inspections of planted Ribes were made in California, in 17 counties, as follows:

San Diego	8	Stanislaus	2
Los Angeles	8	San Joaquin	3
Kern	1	Santa Clara	8
Kings	1	Sacramento	3
Tulare	2	Sonoma	2
Merced	1	Yolo	1
Monterey	4	Nevada	1
Santa Cruz	13	Humboldt	1
		Shasta	2

No case of Cronartium infection on Ribes was found in the course of these inspections.

Form Letters: In conjunction with the records obtained from the nurseries, form letters, each including a copy of Farmer's Bulletin No. 742, were sent out to parties who, either this year or in previous years, have purchased Ribes or five-leaf pines. During the season of 1919, 1658 of these form letters were sent out to persons in California. To date 357 replies have been received. Thus 21.5% of these form letters were answered.

SCOUTING IN SOUTHERN CALIFORNIA.

Cronartium Reported: In April, 1919, the occurrence of a Cronartium on currant plants in a nursery at Pasadena was reported to Dr. E. P. Meinecke, Forest Pathologist at San Francisco, by Mr. Frederick Maskew, Chief Plant Quarantine Inspector of California. This report was confirmed on April 21 by Mr. Studhalter's inspection of the nursery at Pasadena. Learning that the diseased plants were

of a recent shipment from the Pioneer Nursery at Monrovia, Mr. Studhalter made an inspection at Monrovia, and found diseased plants in the nursery. He then scouted the wild plants in the vicinity and found them to be heavily infected.

It was later learned from the horticultural inspector at Monrovia, Mr.Philipson, that the disease had been observed by him on wild currant plants in the immediate vicinity for four years.

Status of Pioneer Nursery: For a number of years the Pioneer Nursery had imported five-leaf pines, pinon pines, and Ribes from various points in Europe, Japan, and the eastern section of the United States. Ribes species indigenous in this region had been collected from time to time, and brought into the nursery, where the imported and locally propagated plants were growing. The nursery had done considerable local retail business in both pines and Ribes. One instance is recorded of imported five-leaf pines being shipped to another part of the state. The case of the Pasadena nursery, where the infection was first found, is an instance of the manner in which diseased Ribes had been sold to neighboring nurseries. In this particular case, the plants were already resold, and were awaiting reshipment.

The following importation records were secured from the invoices of the nursery:

Importation: Five-leaf pines.

1 P. cembra from France in 1904.

50 P. strobus from France in 1909.

100 P. strobus from Barbier & Co., France in 1910
(A source known to be dangerous)

13 P. koraiensis from Yokohama, Japan, in 1910.

64 P. strobus from Douglas, Waukegan, Ill., in 1912.

3 P. flexilis from Biltmore Nursery, Asheville, N.C. in 1913.

113 P. flexilis from D. Hill, Dundee, Ill.
(A source known to be dangerous)

100 P. strobus from American Forestry Co., Framingham, Mass. (Locality infected)

2. Pinon Pines:

30 P. quadrifolia from local seed.

12 P. monophylla from Pasadena.

58 P. edulis from Barbier & Co., France,
(Probable source)

10 P. cembroides from Biltmore Nursery, Asheville, N.C.

16 P. edulis, origin unknown.

50 P. cembroides from Barbier & Co., France.

3. Ribes:

8 R. atrosanguineum from Barbier & Co., France.

6 R. aureum from either Barbier & Co., France; or Skinner, Topeka, Kansas.

Several large shipments from the Oregon Nursery, Orenco, Oregon, which has imported pines and Ribes from Europe and eastern United States.

Preliminary Survey: Professor Bethel and Mr. Posey went to Monrovia and made a preliminary study of the disease and the conditions under which it occurred. Several weeks were spent in scouting the wild Ribes in the immediate vicinity and inspecting pine and Ribes plantings in neighboring nurseries and gardens. The disease was very abundant on wild Ribes throughout the lowlands at Monrovia and extended out several miles from town. Diseased material was sent to Washington, D. C. for identification of the fungus. Pinon pines and sugar pines were inspected in the San Bernardino Mountains, 25 to 40 miles distant from Monrovia and no disease was found on them. The Ribes in this locality were not yet in full leaf.

A field conference was held at Monrovia on May 20th, consisting of Dr. E. P. Meinecke, Professor Bethel, Mr. Hunt, Mr. Studhalter, and Mr. Posey. It was decided that while the Cronartium in the field very closely resembled C. occidentale, it also had a striking resemblance to white pine blister rust. It was realized that the white pine blister rust had not been observed under such field conditions as those existing in this locality, and no one was qualified to state what its reaction to such conditions would be. Until such time as cultural work would show definitely the identity of the fungus, it was agreed that the disease at Monrovia must be potentially accepted as the white pine blister rust, and immediate attention given to its present distribution and probable origin.

Situation: A Cronartium on Ribes was present in California in a locality where five-leaf pines and Ribes had been introduced from dangerous sources. A preliminary examination of the disease had failed to establish its identity. In the San Bernardino Mountains, approximately 25 miles distant, were stands of sugar pines, with probable chains of Ribes connecting them with the diseased plants. It was necessary to know whether the Cronartium was C. occidentale or C. ribicola as quickly as possible. Extensive scouting would probably determine present distribution of the disease, and whether it had spread from the pinons or five-leaf pines to the nursery or whether it was spreading from the nursery towards the five-leaf pines region.

It was decided to formulate plans for thorough scouting, in order to determine the limits and origin of the disease at once.

Scouting:

Organization and Personnel: Plans for scouting were made by Dr. Meinecke. The following men were secured for the work: George A. Root, Henry N. Putnam and Harlan R. Wilson. Mr. R. A. Studhalter then arranged the details and worked with the men in the field until satisfied with the progress they were making.

Guide Maps: U. S. topographic sheets were subdivided by lines, dividing the sheet into smaller units, usually two minutes. These smaller units were used as the scouting units. (Note: the size of the unit was governed by character of country to be scouted. Rough wooded country was worked in small units, while denuded dry

lands were worked in large units.)

Field notes: I. P. note books were furnished - the filler sheets were lined and the headings for the various types of information desired were printed. Space was provided at the bottom of the sheet for a sketch adopted from the scouting map to show inspection points. These points were numbered in the notes and on the sketch enabling one to again locate the point on any accurate map of the territory.

Method of travel: The country was rough. Travel was by horseback and by foot.

Territory covered: The following territory was covered: Coast Range Mountains of Los Angeles County and Northern Ventura County. Tebachapi Mountains of Northern Los Angeles County and Southern Kern County. The scouting was conducted by routes as given from the following centers:

1. Monrovia to Fernando: From Monrovia northwest through El Monte, Pasadena, the Arroyo Seco, Verdugo Canyon, Glendale, Burbank, and La Tuna Canyon northward into San Fernando Valley, through Pacoima and Sunland.

2. Saugus: East from Saugus, along the Santa Clara River and Soledad Canyon to Ravenna. South into Arrastre Canyon. Southeast into Aliso Canyon. Northeast to Vincent, west to Sierra Pelona Valley and Agua Dulce School in Mint Canyon. North from Vincent to Una Lake, at the edge of the Mohave Desert, north into the desert to Palmdale. Southeast from Palmdale to Shoemaker, and

up Rock Creek. West from Palmdale up the Anaverde Valley and Leoni Valley. Southwest into Bouquet Canyon. Southwest into Deadman Canyon, and east into Mint Canyon, to Oaks Garage. Mint, Tick and Agua Dulce Canyons scouted.

North from Saugus into Dry Canyon, San Francisquito Canyon, and Castac Valley. Northwest in Castac Valley, and up Violin Canyon to Oak Flat. Northwest and north, down Alamos Creek, and east to Quail Lake. East to Neenach, in the Antelope Valley (part of the Mohave Desert). South from Neenach into Oak Grove Canyon. Southwest on Pine Canyon Road to Elizabeth Lake. South down San Francisquito Canyon to Saugus.

3. Newhall: West from Newhall up Pico Canyon. Northwest from Newhall, up Castac Creek, up Tapia Creek. West along Santa Clara River to Piru. North along Piru Creek to Reasoner Canyon. East from Newhall along Santa Clara River, south into Sand Canyon, and west along Placerita Creek.

4. Maricopa: Northwest along foot of hills to Taft. Southeast from Maricopa by Pattiway to the Cuyama Valley. West across valley to Santa Barbara Canyon.. Southeast up valley to Morro Hill, to Castle Canyon.

Southeast from Maricopa along base of hills to Santiago Creek, and into San Emigdio Mountains.

5. Lebec: Immediate vicinity of Castac Lake scouted. West from Lebec into Cuddy Canyon. West and southwest into Lockwood

Valley. North from Lebec in Castac Valley. East from Lebec up Pastoria Creek. South from Lebec to Maxy Canyon.

6. Caliente: East along Caliente Creek to Oiler Canyon. East along Caliente Creek to Loraine. South from Loraine along Tollgate Canyon. East from Loraine along Sand Canyon and Back Canyon. North to Piute, to Grouse Meadow, north to vicinity of Claraville. North into French Gulch, and southwest to Piute Mountain. Southwest to Walker Basin, across Valley to Rankin Ranch, and southwest to Caliente over Oiler Canyon Road. Southeast from Caliente, by Keene, to Tehachapi. West from Tehachapi into Cummings Valley. Southwest through valley, and south by trail to Tejon Canyon. West along Tejon Creek to Tejon Ranch. Southwest along edge of hills to Pastoria Creek. South up Pastoria Creek to summit of Tehachapi Mountains. Northwest into Brite Valley, north to Caliente.

Host Plants: Pines: P. lambertiana occurs in the mountains of southern California, wherever these mountains reach an altitude of 6000 feet or more. P. Monophylla also occurs in arid regions.

Ribes: R. gracillimum, R. malvaceum, G. hesperia, G. amara and G. velutina were found in the country scouted. The Ribes in these regions generally occur in the canyons and washes which are dry in summer, but have moisture below the surface. In southeastern Kern County, R. Nevadense was found.

Disease Found: The following table gives the infections of Cronartium on Ribes in these regions. The estimated distance to both five-leaf pines and pinon pines is given.

Infection	Host Species	Severity	Distance from five-leaf pines	Distance from pinon pines
La Tuna Canyon	R. gracillimum	50-60%	25 miles	20 miles
Roscoe	do	.01%	25 do	20 do
Burbank	do	10-75%	25 do	20 do
Pacoima	do	20%	25 do	15 do
Tujunga	do	1%	25 do	15 do
Oaks Garage	do	.1-2%	20 do	(Immediate vicinity)
Agua Dulce School	do	.1-2%	20 do	do
Pico Canyon	do	.1%	35 do	7 miles
Tapia Canyon	do	50%	25 do	5 do
Sand Canyon	do	.1%	30 do	5 do
Placerita Creek	do	.1-50%	35 do	5 do

SUMMARY

1. Eleven points of infection of Cronartium on Ribes were found in the coast range of Southern California.

2. These infections all occurred on R. gracillimum.

3. There was but one case of telial infection - at La Tuna Canyon - all othersbeing uredinial.

4. No infection of peridermium was found on any five-leaf pine.

5. No infection of peridermium was found on any pinon pine.

6. No infection on Ribes was found in the Techachapi Mountains, leading toward the main belt of five-leaf pines in California. Thus we have at present no connecting link between the southern infection, and that occurring in the Yosemite Valley region.

7. Similarly, there is no connecting link between the Ribes infection in the south and the P. monophylla infection in the Sierra Nevada Mountains.

SCOUTING IN THE SIERRA NEVADA MOUNTAINS.

Cronartium Reports: On July 21 a telegram was received from Professor Bethel, Forest Pathologist at Denver, Colo., stating that one of his correspondents, Mrs. Clemens, a member of the Sierra Club, had discovered a Cronartium on Ribes in the Yosemite National Park.

Preliminary Scouting: Mr. Posey and Mr. Wyckoff went to the Yosemite region at once, and scouted the following country, travelling on foot: Yosemite Valley, from Yosemite Village to the foot of Nevada Falls, and return. Yosemite Village to Mirror Lake, to Snow Creek, to Lake Tenaya and return. A Cronartium was found on Ribes at Snow Creek and the immediate vicinity. It occurred on a few infected leaves per plant. These infected plants were widely distributed over an area of several square miles. In some cases the plants were growing immediately adjacent to sugar pines. Close inspections of these pines were made, but no evidence of a peridermium was found.

Situation: The occurrence of a Cronartium on Ribes in the sugar pine forests at a point 30 to 100 miles removed from pinon forests, and with a high mountain range separating the two, was considered cogent reason for undertaking a thorough inspection of pines and Ribes in the whole region.

This country is very rough, and has practically no population outside of summer resorts and logging camps. The only accommodations to be had were at the summer resorts. The distance between these was too great, and their rates were too high to be considered for use of the scouts. Inquiries were made concerning means of transportation through the mountains, but figures quoted for either automobiles or pack animals with a camp outfit were also unreasonably high for our work.

It was decided to call in a suitable number of scouts, organize a scouting party, and equip it with an automobile and camping facilities.

Organization of Scouting Party. Personnel: Mr. Putnam, Mr. Root, and Mr. Wilson, from southern California, and Professor Garrett from Utah were called in to form a field crew for scouting in this region. Professor Garrett was placed in charge of the party. Mr. Posey scouted with the party for several days.

Equipment, Transportation, and Subsistence: Mr. Wilson's personally owned automobile, together with full camping equipment, were secured. Subsistence supplies were purchased as

as needed at the most convenient points. Each man took his turn at the various duties of camp work, such as cooking and cleaning camp.

Instructions: The following were the instructions to the scouting party: "To begin scouting at Merced, working eastward along the road to Wawona, until the first infection is found on Ribes. To follow this infection in the line of its increasing concentration, giving more attention to the inspection of five-leaf pines as the disease on Ribes becomes heavier. The points showing highest concentration of infection on Ribes are to be taken as an indication of pine infection in the vicinity."

Scouting Operations: Inspection points: In order to avoid making the scouting progress too slow, suitable inspection points were selected as fairly uniform intervals. In general the point where the car was stopped served as a scouting center, and the inspections were made in a radius of one-fourth of a mile about it.

Territory Covered: The following gives the route of the scouting party, showing the territory covered: Merced east to El Portal, and return. Merced southeast to Wawona, north to Yosemite Valley. Entire valley scouted. Northwest on Big Oak Flat Road to Carl Inn. East on Tioga Pass (summit of Sierra Nevada Mountains) and southeast, down east slope, to Mono Lake. North from Mono Lake to Bridgeport, to Carter's Station, Nevada. West to Lake Tahoe.

Professor Garrett left the party at Bridgeport, returning to Salt Lake City, Utah, to resume his permanent teaching duties. Mr. Wilson returned to Los Angeles from Lake Tahoe, with his automobile. The rough character of this country renders the operation of an automobile extremely expensive. Mr. Wilson did not feel justified in Continuing further at the rate of compensation he would receive for operating his car. Mr. Root and Mr. Putnam joined by Mr. Randall, continued to scout in a northerly direction, travelling by railroad or on horseback, as the conditions permitted. The following territory was scouted by these three men: Lake Tahoe region, North to Truckee, Donner Lake, Lake Independence, Hobart Mills, Sierraville, and Loyalton. The region from Sierraville north to Susanville and Alturas was thoroughly scouted. Northwest from Sierraville to Mineral and Red Bluff. North to Redding, northeast to Fall River, west to Sisson.

Host Plants: Pines: Practically all of the region scouted on the west slopes of the Sierra Nevada Mountains, and on the east slopes north of Lake Tahoe was heavily forested with P. lambertiana and P. ponderosa. At altitudes above 7500 feet, the P. lambertiana was largely replaced by P. monticola, and the P. ponderosa by P. contorta. On the east slopes, under much more arid conditions, P. monophylla occurred in almost pure stands.

Ribes: On the west slopes of the Sierra Nevada Mountains, R. nevadense and G. Roezli occurred in great profusion up to an altitude of 8000 feet. Above this elevation, R. viscosis-

simum, R. montigenum, and R. cereum were found. On the arid east slopes, G. velutina occurred, closely associated with the belt of P. monophylla. On the east slopes in the Tahoe region and northward, R. nevadense, R. cereum, G. Roezli, and G. divaricata were found.

Infections Found: The following table gives the infections of Cronartium on Ribes and the infections of peridermium on P. monophylla found in these regions. In the case of every infection on Ribes, the estimated distance to both five-leaf pines and pinon pines is given:

* * *

Infection	Species of Host	Severity	Altitude	Distance from White Pine	Distance from Pinon Pine
El Portal	G. Roezli	Slight.	4000	Immediate vicinity.	39 miles.
Mariposa Big Trees	do	do	5000-5400	do	36 miles
Chilnualna Falls	do	do	4100-5900	do	36 do
Wawona	G. Roezli R. nevadense	do	5500	do	38 do
Eightmile	G. Roezli	do	5500	do	34 do
Elevenmile	do	do	6000	do	33 do
Grouse Creek	do	do	5300	do	33 do
Fort Monroe	do	do	5500	do	32 do
Mirror Lake	do	do	4000	do	24 do
Tamarack Flat	do	do	6300	do	33 do
Crane Flat	do	do	6200	do	39 do
Carl Inn	do	do	4400	do	40 do
Aspen Valley	do	do	6700-7200	do	36 do
Porcupine Flat	do	2%	7800	do	26 do
Snow Creek	G. Roezli R. nevadense	Slight	7000-7800	do	22 do
Leevining Creek	G. velutina	do	7000	6 miles	Immediate vicinity.
Goat Ranch	do	do	6800	11 do	do
Mormom Meadow	do	98%	7000	11 do	do
Bridge County Farm	G. velutina R. aureum	80% 95%	7000	15 do	do
do	P. monophylla	12 specimens 3 trees	7000	15 do	--

Infection	Species of Host	Severity	Altitude	Distance from White Pine	Distance from Pinon Pine
Bridgeport	R. aureum	85%	6500	15 miles	1 mile
Yaney Canyon	G. velutina	95%	6500	11 miles	Immediate vicinity.
do	P. monophylla	1 tree	6500	11 do	--
Chris Flat	R. aureum G. velutina	5% 85%	7000	5 do	Immediate vicinity.
do	P. monophylla		7000	5 do	--
Toll House	R. cereum G. velutina	5% 90%	6500	5 do	Immediate vicinity.
do	P. monophylla	4 specimens	6500	5 do	--
Mountain House, Nevada	G. velutina	90%	6000	15 do	Immediate vicinity.
do	P. monophylla	95%-100%	6000	15 do	--
Emerald Bay	G. Roezli	25%	6200	Immediate vicinity.	28 miles
Tahoe City	do	35%	6200	do	35 do
Donner Lake	do	25%	6150	do	38 do
Sierraville	do	Slight	4900	do	24 do
Hobart Mills	G. divaricata	do	4800	6 miles	30 do
Mineral	G. Roezli	5%	4700-5100	Immediate vicinity.	70 do

SUMMARY

* *

1. Infections of Cronartium were found on the west slopes of the Sierra Nevada Mountains on G. Roezli and R. nevadense. The infection was much more frequent on the former species. These infections occurred at altitudes from 4000 to 7800 feet.

2. This infection was very light, averaging from 1 to 5 leaves per plant. A few cases of uredinial infection were found, but the majority were telial.

3. The lightness of this infection gives strong evidence that the disease does not winter over on Ribes, on these west slopes.

4. No evidence of a peridermium was found on any five-leaf pine.

5. Infections of Cronartium were found on the east slopes of the Sierra Nevada Mountains on G. velutina, R. aureum, G. Roezli, R. cereum, and G. divaricata. These infections occurred at altitudes from 4800 to 7000 feet.

6. Infections of a peridermium on P. monophylla were found on these east slopes, at altitudes from 6000 to 7000 feet.

7. The infections of Cronartium on Ribes on the east slopes, where these plants were closely associated with infected P. monophylla, were much heavier than those found on the west slopes.

8. With the exception of the infection at Mineral, the known infections on Ribes occurring lowest down on the west slopes of the Sierra Nevada Mountains are approximately 40 miles in an air line from the nearest P. monophylla. They are also separated by the summit of the mountains, the lowest passes of which are over 9000

feet in this region. The accompanying map will show the relation of the Ribes and P. monophylla infections.

9. The mineral infection is at the summit of the Sierra Nevada Mountains, and approximately 70 miles in an air line from any possible P. monophylla.

DISTRIBUTION OF WILD RIBES IN CALIFORNIA.

A great deal of data was collected on the distribution of the native species of Ribes that occur in California. Forty-eight species occur in this state out of a total of eighty-three given for the entire continent, in the North American Flora. The reasons for the occurrence of this relatively large number of species can be understood by a realization of the geographical and climatological factors controlling plant growth in California. The length of the state from north to south, nearly ten degrees of latitude, gives rise to a great variance in temperature. The mountain ranges of the state are large factors in the control of rainfall. From the standpoint of temperature, rainfall, and altitude, the state quite naturally falls into the divisions given below, and shown in the accompanying map.

1. Northwest coast. Very cool and humid. 40 to 60 inches of rainfall annually.

Total number of Ribes species, 11.

Species occurring in greatest abundance: G. menziesii, R. sanguineum.

2. Coast ranges. Cool and humid. 12 to 25 inches of rainfall annually.

Total number of Ribes species, 19.

Species occurring in greatest abundance: R. sanguineum, R. glutinosum, R. malvaceum, G. Menziessi, G. divaricata.

3. Interior valleys. Very hot and dry in summer. 8 to 22 inches of rainfall annually.

No Ribes reported indigenous in this region.

4. Sierra Nevada Mountains. Heavy snows in winter, warm in summer. 20 to 30 inches of rainfall annually.

Total number of Ribes species, 24.

Species occurring in greatest abundance:

R. nevadense - 4000 to 8000 feet, on west slopes, and east slopes from Lake Tahoe northward.

R. viscosissimum - 6500 to 9000 feet.

R. montigenum - 7500 to 11,000 feet.

R. cereum - 5000 to 11,000 feet.

R. aureum - 4000 to 6000 feet on east slopes.

G. Roezli - 4000 to 8600 feet on west slopes, and east from Lake Tahoe northwest.

G. velutina - 2500 to 9000 feet on east slopes.

G. divaricata - 3000 to 5000 feet on east slopes from Lake Tahoe northward.

5. Southern California. Hot and arid. 2 to 15 inches of rainfall annually.

Total number of Ribes species, 20.

Species occurring in greatest abundance:

R. gracillimum, R. malvaceum, R. indecorum, G. hesperia, G. Parishii, G. amara, G. speciosa.

Inasmuch as extensive scouting operations were carried on only in the southern California and Sierra Nevada Mountain regions this year, the bulk of the specimens have been collected from there. There have been a few specimens collected from Eureka, in the northwest coast region, and a few from the vicinity of Berkeley, in the Coast Range region.

In the identification of specimens, the following books have been used: North American Flora, Coville and Britton. Flora of Los Angeles and vicinity, Abrams. Yosemite Flora, Hall. The office has had recourse to the herbarium of the University of California, at Berkeley, and the herbarium of the California Academy of Sciences, at San Francisco.

DISTRIBUTION OF FIVE-LEAF PINES IN CALIFORNIA.

Data on the distribution of five-leaf pines in California was collected by a method similar to that used for the native Ribes. Scouting indicated relatively small and isolated groups of P. lambertiana in southern California, and large stans of P. lambertiana in the Sierra Nevada Mountains, with considerable P. monticola at high altitudes.

Sudworth's Forest Trees of the Pacific Slope and Jepson's Silva of California were of great value in determining the distribution of five-leaf pines in this state. From these sources maps

were prepared, showing this distribution. These maps show a broad belt of five-leaf pines running down the Sierra Nevada Mountains from Oregon to a point where the Sierra Nevada Mountains join the Tehachapi Mountains. There is also a broad belt running down the coast ranges from Oregon to Sonoma County. In the coast ranges south of San Francisco, and in southern California there are relatively small groups of these pines.

TERRITORY WHERE NEITHER NATIVE RIBES NOR NATIVE FIVE-LEAF PINES ARE FOUND.

There are 2 regions in California where neither Ribes nor five-leaf pines are reported to be indigenous.

1. The southern deserts, comprising northeastern Los Angeles County and western San Bernardino Counties, and the major portion of Imperial County. These are regions of low altitude, in some cases being below sea level, and great aridity. It would be entirely unnecessary at the present time to scout over this country, with the exception of Imperial Valley, where a few cultivated Ribes occur. It must be remembered, however, that by means of large irrigation projects, the deserts of California are coming more and more under cultivation. When this region is cultivated there will doubtless be some Ribes planted as ornamentals and in gardens, but climatic factors will prevent any large commercial plantings. Inspection will never be a large item in these regions.

2. The Sacramento and San Joaquin Valleys, comprising all of the interior valleys region discussed above. This region is already

developed by irrigation and most of it farmed. Although there are no indigenous Ribes or pines reported, there have been some plantings of each.

The pines and Ribes planted in these regions prior to the enactment of the quarantine laws should be inspected until it is certain that they are free of white pine blister rust. With the quarantine law functioning properly, these regions could be ignored in the future.

WHERE BLISTER RUST MAY HAVE BEEN INTRODUCED.

In regard to the introduction of Blister rust into California by means of imported pines, two sections of the state are to be regarded with suspicion. These are southern California and the San Francisco Bay region. There has been a large influx of people from the eastern states into these two regions, and in many instances, large estates, with considerable planting of ornamentals, have been established. The discovery of Cronartium is southern California in April, 1919, will show the possibility of the introduction of the disease.

Ribes plantings have been made extensively in southern California and the northwest coast counties. In the latter case, a great deal of stock has been purchased from the Oregon Nursery at Orenco, Oregon. Although no disease has been found in this nursery, it was regarded with suspicion for some time, due to the fact that it had imported Ribes and Pines from dangerous sources

in France and the eastern part of the United States.

RELATION OF THESE AREAS TO THE FIVE-LEAF PINE FORESTS OF CALIFORNIA.

Although small groups of P. lambertiana occur in the southern part of California, this region is separated from the main belt of five-leaf pines by the Mohave Desert and the Tehachapi. The Mohave Desert would undoubtedly prove an efficient barrier to the spread of the disease. Ribes occur in small numbers all through the Tehachapi Mountains, so that it might be possible for the disease to reach the main five-leaf pine belt through this channel.

The San Francisco Bay region is completely isolated from the five-leaf pine belt. There are no five-leaf pines in this portion of the coast ranges, and the San Joaquin Valley separates this locality from the Sierra Nevada belt.

The northwest coast region is directly adjacent to the five-leaf pine belt which runs north into Oregon, and eastward through the mountains to the Sierra Nevada belt. If infection were introduced into this region, it would have no difficulty in reaching the five-leaf pines.

In regard to the possible dissemination of Cronartium in California, climatic factors must be largely considered. Due to the mild winters, there is no period of complete defoliation. The young growth of Ribes always appears while the old leaves are still on the plant. Under these conditions it would be entirely

possible for the Cronartium to winter over on the Ribes. In this way it would be able to travel long distances without the necessity for the aecial stage on pine.

SPECIAL RECOMMENDATIONS FOR FUTURE WORK IN CALIFORNIA.

Scouting: 1. There is at present an undetermined Cronartium in California. It has so far been found in every locality in the state where sufficient scouting has been done. A number of these centers of infection are within the five-leaf pine belt. For these reasons, the entire five-leaf pine belt of California should be scouted.

2. A disease of the Cronartium type could easily over-winter on Ribes in California, because of the mild winters. Thus, an infection of Cronartium might travel for a long distance on Ribes before it attacked the alternate pine host. For this reason, the distribution of any Cronartium on Ribes, whether in the five-leaf pine belt or not, should be determined.

Inspection: The identity of the Cronartium occurring in the Pioneer Nursery at Monrovia has not been settled. All pine and Ribes stock, either imported or from local sources, which has been sold by this nursery should be inspected.

Geographic & Climatic Divisions of California

U. S. DEPARTMENT OF AGRICULTURE

DIVISION OF PUBLICATIONS

July 1, 1917

A. HOEN & CO. BALTO.

Scouting maps for Southern California and Sierra Nevada Mountains not complete.

REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN IDAHO.

* * * * *

INTRODUCTION.

Summary of Work 1917-1918: Blister Rust work in Idaho was begun in the spring of 1917. For the seasons of 1917 and 1918 the work consisted in collecting records of importations of five-leaf pines and Ribes, and inspecting these plantings. These records were obtained from:

1. Nursery invoices and sales slips.
2. Custom house records.
3. Records from the Washington office.
4. Horticultural inspectors' records.

It was found that 14 nurseries have been located in Idaho during the past ten years. From the information obtainable it seems that most of the state is supplied with nursery stock from outside sources. From 1907 to 1918, 165 nurseries made shipments into Idaho, 16 of these being located in the East. In fact, most of the nurseries in the state are simply agents for larger concerns located in other states.

A total of 47 plantings of five-leaf pines, representing 4096 trees, were recorded. The records for Ribes total 4485, these plantations being located in 312 communities.

During the seasons of 1917 and 1918, 907 plantings of Ribes, in 183 communities, and 7 plantings of five-leaf pine, were inspected. Most of the work was done in the five-leaf pine belt in the northern part of the state.

INSPECTION OF IMPORTED STOCK, 1919

During the season of 1919, the inspection work in Idaho was done by Mr. Renner and Mr. Lankenau. 781 plantings of Ribes were inspected, in 98 communities. 44, or all but 3, of the imported five-leaf pine plantings were inspected. This work, similarly to that of the two previous seasons, was largely concentrated in the northern part of the state, in the five-leaf pine belt.

The accompanying table will show the number and location of the plantings and inspections for the past three years.

SCOUTING.

The scouting work in Idaho for the season of 1919, was done by Mr. Stillinger, Mr. Renner, and Mr. Lankenau. The scouting was confined to the northern part of the state, and in the Salmon River Valley. The following gives the territory scouted.

1. Salmon River Valley, from Gibbonsville to Carmen, to Salmon City, to Baker, to Lembii, to Leadore, to Gilmore.
2. Humphrey to Spencer, along Canyon Creek.

3. Priest River to Coolin.

4. Priest River to Sandpoint and vicinity, to Bonners Ferry, to Eastport to Porthill.

DISTRIBUTION OF WILD RIBES.

In all the state where work has been done, wild gooseberries/and currants have been reported as very plentiful. From the data obtained in the field, together with information from botanical keys and publications, it has been determined that 11 species of Ribes are indigenous to Idaho. They are quite generally distributed over the state. Those occurring most abundantly are R. aureum, R. cereum, R. lacustre, R. viscosissimum, and G. irrigua.

DISTRIBUTION OF NATIVE FIVE-LEAF PINES.

Three species of five-leaf pines occur in Idaho, in quite large stands. These are, in order of their importance, P. monticola, P. albicaules, and P. flexilis.

P. monticola occurs in the northern part of the state, from the Salmon River northward. It represents a very large commercial stand in this region.

P. albicaulis occurs in large stands along the Bitter Root Mountains, and in large scattered areas in the central part of the state, at higher altitudes.

P. flexilis occurs along the Bitter Root Mountains, and in the central and southeastern part of the state, at higher altitudes.

BARRIERS TO THE WHITE PINE BLISTER RUST.

There is no part of Idaho which would constitute a barrier to the White Pine Blister Rust. The southwestern portion of the state contains no indigenous five-leaf pines, and might be considered as a part of the barrier formed by eastern Oregon, to which it is adjacent. But the scattered areas of five-leaf pines in southeastern and central Idaho, and the large stands in the north would enable the disease to circle around this area, if it were introduced from an easterly direction.

REGIONS WHERE WHITE PINE BLISTER RUST MAY HAVE BEEN INTRODUCED.

Host plant shipment has been very heavy in the following counties: Bonner, Kootenai, Latah, Idaho and Boise. The disease may easily have entered this region on one of the many shipments and later escaped to wild plants.

RELATION OF THIS REGION TO THE FIVE-LEAF PINE FORESTS.

With the exception of Boise County, this area all lies within or immediately adjacent to the large stands of P. monticola in northern Idaho. Boise County is connected with this main belt by smaller groups of P. albicaulis and P. flexilis. The introduction of the disease into any part of this region, unless it was soon discovered and eradicated, would undoubtedly lead to the in-

fection of the main five-leaf pine forests of the Far West.

RECOMMENDATIONS FOR FUTURE WORK.

Scouting in selected regions and some shipment inspection work should be done in southern Idaho. A great deal of the work has been done in the northern part of the state, but very little attention has been given to scouting wild plants. The five-leaf pine area should be thoroughly scouted. A preliminary survey of plantings should be made through the use of form letters.

The county fairs at Coeur D'Alene, Moscow, Lewiston, Potlatch, Bonners Ferry, Sand Point and St. Maries in the northern part of the state where the commercial stand of white pine occurs should have a good exhibit of Blister Rust, thus reaching the people in every white pine community and giving them a good idea of what to look for as they examine the plants in their community. The state fair at Boise, should also have an exhibit of Blister Rust.

A large permanent exhibit should be placed at the Museum in Boise.

A small exhibit should be placed in the Forestry Department and in the Botany and Pathology Department in the State University at Moscow.

Eleven Riker Mounts should be provided one for each horticultural inspector in northern Idaho, and one for the central horticultural office at Boise.

position of the well-known type represented by the Per- [illegible]

RECORD OF PLANTINGS AND INSPECTIONS, 1917-1919

	RIBES					PINES				
	Plantings Inspected				Cards on	Cards on	Number of	Plantings Inspections		
Counties	1917	1918	1919	Total	File	File	Pine	1917	1918	1919
Ada					180	4	22			4
Adams					40					
Bannock					135	1	5			
Bear Lake					11					
Benewah			109	109	315					
Bingham					122	1	5			1
Blaine					45	2	10			1
Boise					225					
Bonner		294		294	300					
Bonneville					22					
Boundry		124		124	135					
Canyon					246	13	687			13
Cassia					112	1	4			1
Clearwater			28	28	45					
Custer					22					
Elmore					22	2	4			2
Franklin					27					
Fremont					45	1	20			1
Gem					22					
Gooding					135	3	15			3
Idaho			137	137	225					
Jefferson					67					
Kootenai		343		343	450	2	89			2
Latah		25	252	277	350	10	3151		7	10
Lemhi			79	79	79					
Lewis			58	58	90					
Lincoln					135	1	50			1
Madison					90					
Minidoko					112	2	20			1
Nezpenco			106	106	106	1	2			1
Oneida					12					
Owyhee					23					
Power					112	1	5			1
Shoshone		121	12	133	135					
Teton					23					
Twin Falls					90	1	5			1
Washington					180	1	2			1
		907	781	1688	4485	47	4096		7	44

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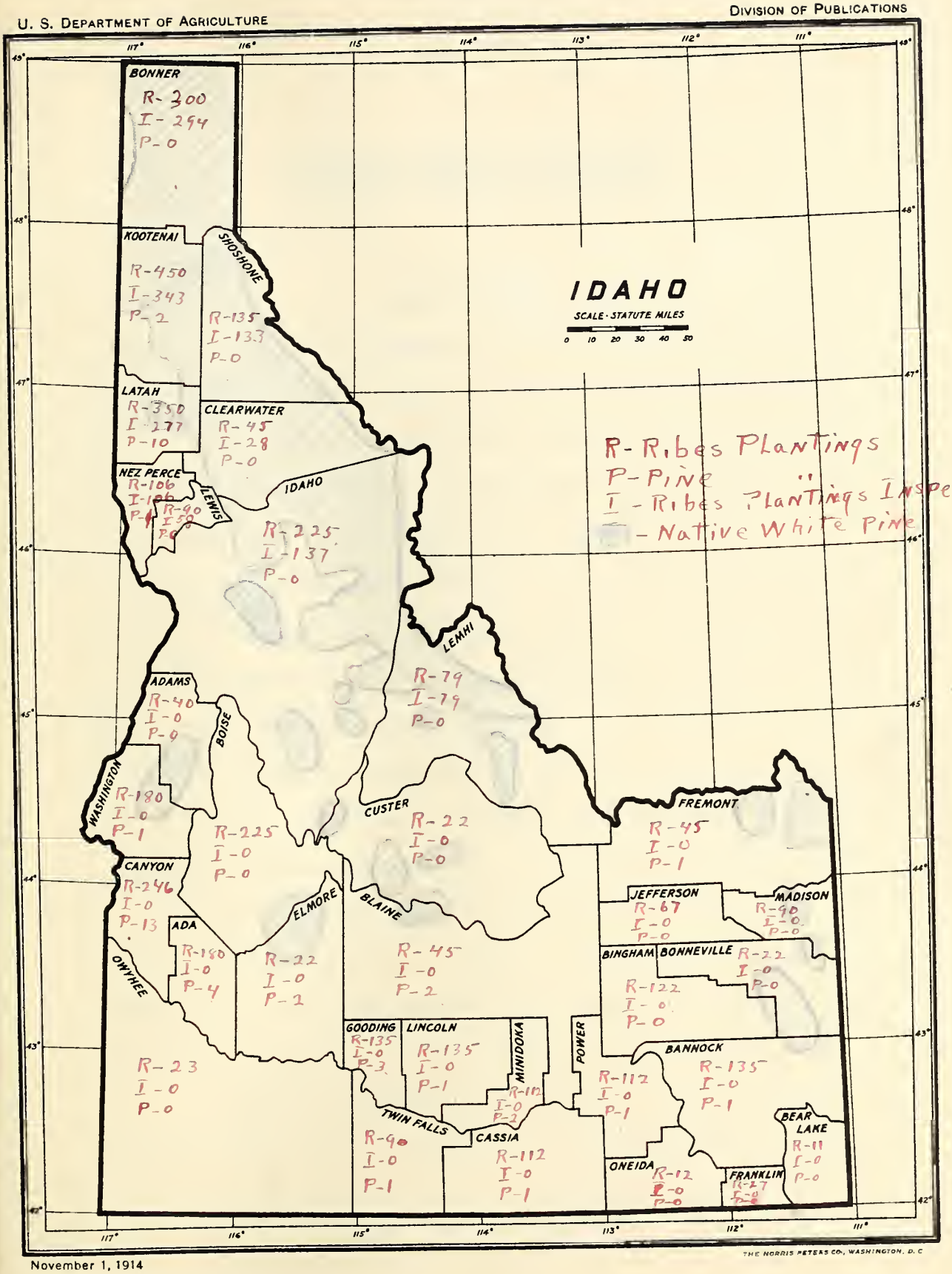

November 1, 1914

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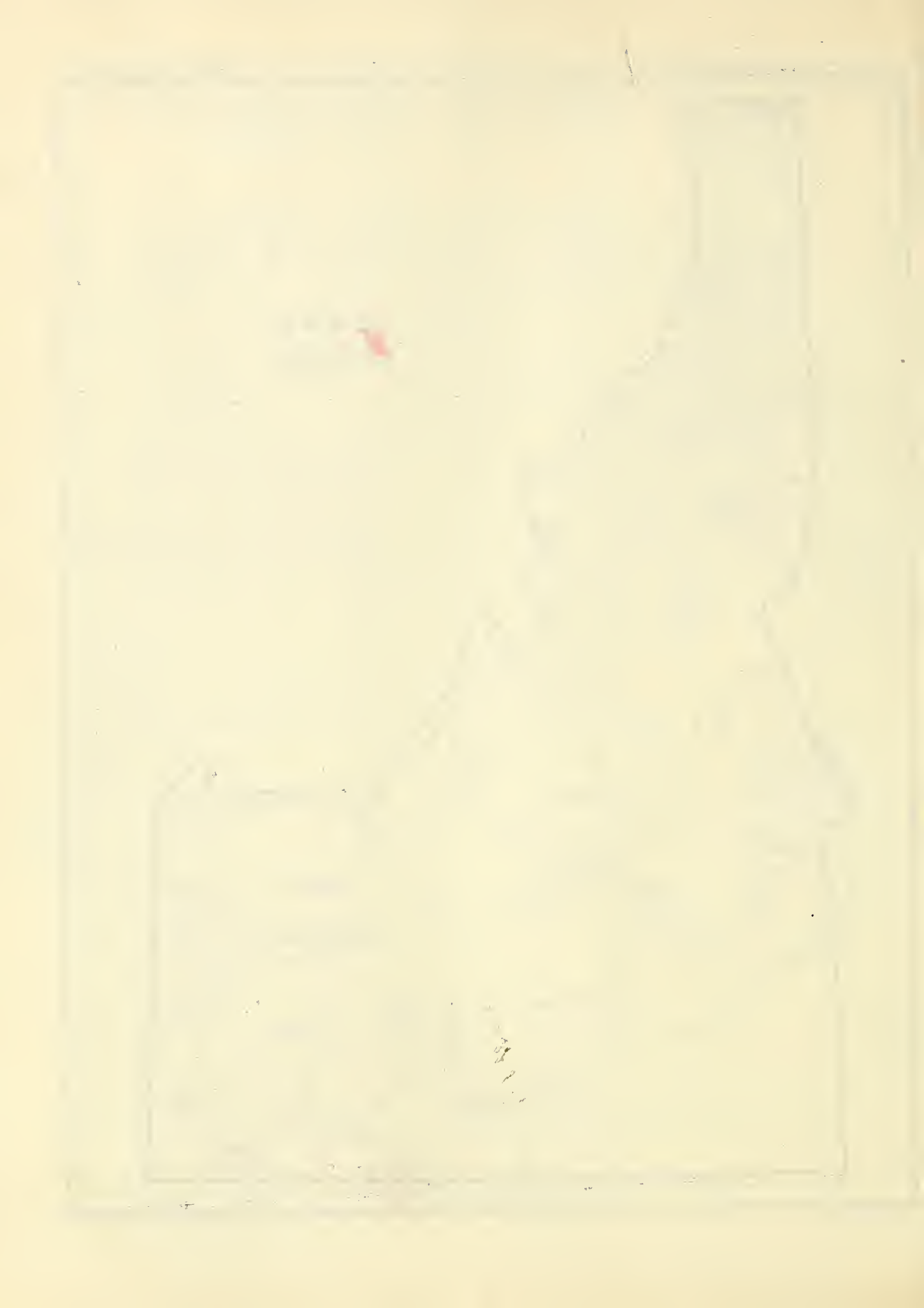


REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN MONTANA.

* * * *

INTRODUCTION.

Summary of Work 1917-1918: Blister Rust work was first undertaken in Montana in 1917. For the first two seasons, the work consisted of collecting records of importations of five-leaf pines and Ribes, and inspecting these shipments. This information was obtained from the following sources:

1. Custom house records.
2. Records of the Washington office.
3. Nursery invoices and sales records.
4. State horticultural records.
5. Information gathered in the field.

Montana has 13 active nurseries. Records show that 126 nurseries outside have shipped in five-leaf pines or Ribes. 53 of these were located in the Eastern States, or Europe.

10,811 card records of Ribes plantings have been made. These represent 80,000 gooseberries and 100,000 currants. 9 plantings of five-leaf pines were recorded, representing 179 trees.

During the seasons of 1917 and 1918, 1937 inspections of planted Ribes were made. Two of the 9 five-leaf pine plantings

were inspected. The work was concentrated in the western half of the state, in the vicinity of the native five-leaf pine forests.

The wild Ribes and native five-leaf pines in Ravalli, Beaverhead, Madison, Jefferson, Deerlodge and Silverbow Counties were scouted during the season of 1917. Information concerning the manner in which this was done is not at hand.

Quarantine Violations: An interesting case of the method some nurseries use to avoid the quarantine law of the states as well as the Federal Quarantine was discovered in 1918. Mr. Rutledge, forest supervisor at Missoula, reported that the Jewel Nursery Company of Minnesota had shipped nursery stock to Rev. Michael Dernody of Aberdeen, South Dakota. It was here shipped to Valley City, North Dakota, and from there mailed to Montana. An actual shipment of Ribes was received in this way by Mr. E. F. White of Missoula. The shipment was caught by the horticultural inspector at Missoula. The stock had a Minnesota inspection tag on it, showing that it came from there. This case was reported to the Federal Horticultural Board.

INSPECTION OF IMPORTED PLANTINGS, 1919.

The inspection of imported plantings for the season of 1919 was done by Mr. Stillinger, Mr. Renner, Mr. Lankenau and Mr. Prentice. 488 inspections of planted Ribes were made in 10 counties. 3 plantings of five-leaf pines were inspected in 3 counties. The other pine plantings were not inspected because they are located in

obscure communities in not particularily dangerous localities. As in the two previous years, this work was concentrated in western Montana, in the region of the native five-leaf pines.

SCOUTING.

The scouting work for 1919 was done by Mr. Stillinger, Mr. Renner, Mr. Lankenau, and Mr. Prentice. The counties of Beaverhead, Silverbow, Gallatin, Deerlodge and Park were scouted. The following gives the territory covered:

1. Troy, to Libby, to Rexford, to Gateway, to Whitefish.
2. Vicinity of Anaconda
3. Butte to Homestake.
4. Dillon, and up Bear Creek.
5. Jackson to Grasshopper Valley, to Big Hole River, to Malkey Creek.
6. Armistead, to Red Rock, along Red Rock Creek.
7. Dell, along Red Rock Creek to Ranger Station.
8. Bozeman to Yellowstone.
9. Bozeman to Springhill.
10. Gardner to Livingston to Bozeman.
11. Livingston to Big Timber (Sweet Grass County)

DISTRIBUTION OF WILD RIBES.

Wild Ribes occur abundantly in all the timbered sections of western Montana and along the streams in the eastern part of the state. Considerable collections of specimens were made by the scouts in western Montana. From this data, together with

information from botanical keys and publications, 12 species of Ribes are found to be indigenous to the state. These are found chiefly in the western mountainous part of the state. The species which occur most abundantly are:

R. americanum
R. lacustre
R. cereum
R. inebrians
R. aureum
R. viscosissimum
G. setosa

DISTRIBUTION OF NATIVE FIVE-LEAF PINES.

Practically all of the native five-leaf pines in Montana occur in the western half of the state. This section is very mountainous, with intervening narrow fertile valleys. In these mountains are scattered stands of P. monticola, P. flexilis, and P. albicaulis, P. monticola occurs in small commercial stands in the northwestern part of the state.

NATURAL BARRIERS TO THE SPREAD OF WHITE PINE BLISTER RUST.

The eastern half of Montana would probably constitute an effective barrier to the spread of the White Pine Blister Rust. This is an open, rolling country, containing no indigenous five-leaf pines. There have been practically no plantings of five-leaf pines in this region. Native Ribes occur along the streams, but the severity of the winters would tend to preclude the pos-

sibility of the disease living over in the absence of its alternate host.

This part of Montana cannot be considered as a barrier in itself. It is really the westernmost part of the great plains area, which forms the great barrier to the spread of the White Pine Blister Rust from the Central States to the Far West.

REGIONS WHERE WHITE PINE BLISTER RUST MAY HAVE BEEN INTRODUCED.

An examination of the card records for Montana shows that imported Ribes have been distributed quite generally over the state. The few five-leaf pines imported have also been well scattered over the state. For this reason, it cannot be said thay any one region of the state is more apt to contain White Pine Blister Rust than any other. However, if the disease were introduced into the eastern portion of the state it would undoubtedly die out. Only an introduction of the disease into western Montana would be of great importance. Here it could establish itself in the native five-leaf pine forests, and could be transmitted to the main pine forests of the Far West.

RECOMMENDATION FOR FUTURE WORK.

The wild Ribes in the eastern part of Montana in sections where imported plantings have been made should be scouted.

Those portions of western Montana not yet scouted should

be covered.

The distribution of the wild Ribes for the whole state should be determined.

Blister Rust exhibits should be made at the following places:

State Fair, Helena.

Botany and Plant Pathology Department, State Agricultural College, Bozeman.

Botany Department, State University, Missoula.

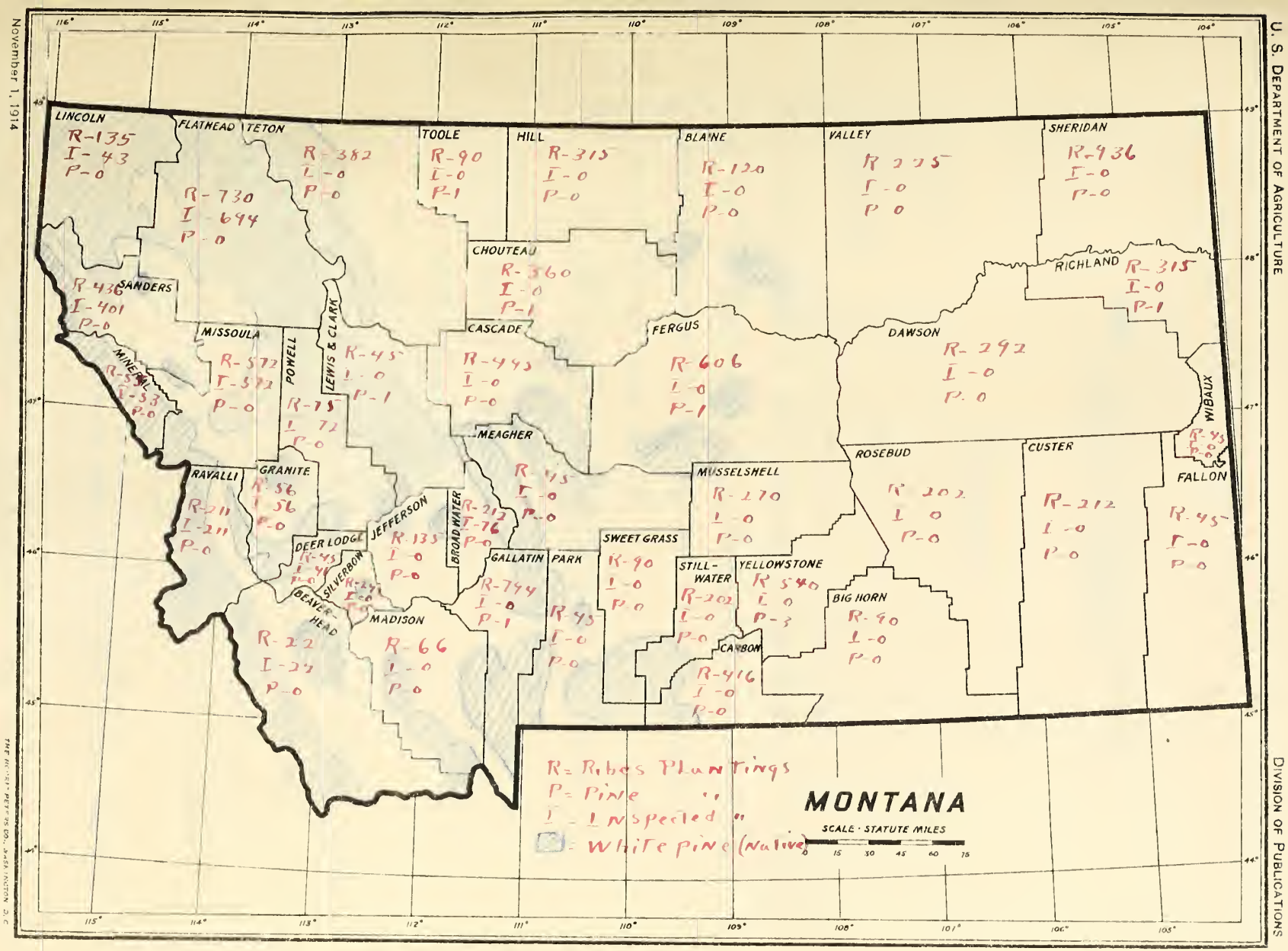
District Forest Office, Missoula.

Riker mounts should be provided for the county inspectors in the western part of the state.

Form letters of inquiry, accompanied by a copy of Farmer's Bulletin No. 742 should be sent out to parties having plantings of imported Ribes and five-leaf pines.

RECORD OF PLANTINGS AND INSPECTIONS, 1917-1919.

	RIBES					PINES				
	Plantings Inspected				Cards on File	Cards on File	Number of Pine	Plantings Inspected.		
Counties	1917	1918	1919	Total				1917	1918	1919
Beaverhead			22	22	22					
Big Horn					90					
Blaine					120					
Broadwater			76	76	212					
Barbon					416					
Carter					22					
Cascades					495					
Chouteau					360	1	2	1		
Custer					212					
Dawson					292					
Deerlodge			41	41	45					
Fallon					45					
Fergus					606	1	20			
Flathead		694		694	730					
Gallatin			184	184	794	1	12			1
Granite			56	56	56					
Hill					315					
Jefferson					135					
Lewis & Clark					45	1	25			1
Lincoln		33	10	43	135					
Madison					66					
Meagher					45					
Mineral		53		53	55					
Missoula		552	20	572	572					
Musselshell					270					
Park					45					
Phillips					180					
Powell			72	72	75					
Prairie					270					
Ravalli		206	5	211	211					
Richland					315	1	1			
Rosebud					202					
Sanders		399	2	401	936					
Sheridan					966					
Silverbow					292					
Stillwater					202					
Sweet Grass					90					
Teton					382					
Toole					90	1	100			
Valley					225					
Wibaux					45					
Wheathead					90					
Yellowstone					540	3	19		1	1
6		1937	488	2425	10,811	9	179	1	1	3



THE HOYT PRESS CO., WASHINGTON, D. C.

REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN WASHINGTON.

* * *

INTRODUCTION.

Summary of Work 1917-1918: Blister Rust work in Washington was begun in the spring of 1917. The work for the seasons of 1917 and 1918 consisted of the obtaining of all possible records in regard to the importation of five-leaf pines or Ribes, and the inspection of as many of these plantings as possible. These records were obtained from the following sources:

1. Custom house records.
2. Shipment records from the Washington Office.
3. Invoice and sales slips of nurseries.
4. Records of horticultural inspectors.
5. Form letters of inquiry.
6. Information picked up in the field.

From these sources, records of 20,559 plantings of Ribes, representing 690,050 plants, and 90 plantings of five-leaf pine, representing 1676 trees, were obtained. The records of the 155 nurseries in the state were checked over, and their stock on hand inspected.

During the season of 1917, 190,300 Ribes plants, and 600

five-leaf pines were inspected. No records are available to show the number of plantings these figures represent. In 1918, 62 plantings of five-leaf pine, representing 1250 trees were inspected. (Nearly all of the important Ribes plantings of which there was a record were inspected) There were 209 plantings inspected, representing 13,121 plants. Most of the inspections were west of the Cascade Mountains, 178 being in Pend Oreille and Spokane Counties.

Form letters of inquiry, asking the location and condition of the specific plants of which a record was held, were sent out for all important plantings during the seasons of 1917 and 1918. For the purpose of instruction, a copy of Farmer's Bulletin No. 742 was enclosed. Approximately 30% of these letters were answered.

INSPECTION OF PLANTATIONS, 1919.

The inspection of planted five-leaf pine and Ribes stock for the season of 1919 was done by Mr. Graham, Mr. Prentice and Mr. Renner. This work was concentrated in the coast counties, and in the northeastern part of the state.

Ribes Inspections: On the coast, between the Washington-Oregon line and the Canadian line, 159 inspections of Ribes plantings were made, in 50 towns. 250 inspections of Ribes plantings in 24 towns, were made in Spokane County, and 93 inspections were made in Ferry, Stevens and Okanogan Counties.

Five-Leaf Pine Inspections: Out of a total of 90 five-leaf pine plantings recorded in the entire state, 82 were inspected during

the season of 1919.

The accompanying table will show the number and location of the plantings and inspections for the past three years.

New Plantings Found: During the season of 1919, 6 new records of five-leaf pine plantings representing 65 trees, were found by the men in the field.

SCOUTING.

The scouting work for the season of 1919 was done by Mr. Graham, Mr. Prentice, Mr. Renner and Mr. Stillinger. The north-eastern part of the state was thoroughly scouted, the following points being covered:

1. Immediate vicinity of Spokane.
2. Cheney, north to Deer Park, south to Rockford, Hillyard, Mead, and Medical Lake.
3. Spokane north to Loon Lake, to Springdale, to Chewelah, to Colville, to Meyers Falls, to Marcus, to Northport.
4. Orient, northwest to Curlew, south to Republic.
5. Molson, west to Oroville, northwest to Chopaka, southwest to Tonasket, south to Huntley, to Riverside, Onak and Okanogan.

The region west of the Cascade Mountains was scouted, as follows:

1. Vancouver to Carson, to Collins, to Underwood, to White Salmon, to Lyle, to Goldendale.
2. Vancouver to Carrolls, to Kelso, to Catlin, to Winlock.

3. Winlock to Ethel, to Morton, to Randle, to Lewis.
4. Chehalis to Centralia, to Tenino.
5. Olympia to Rochester, to Elma, to Montesano, to Cosmopolis, to Aberdeen, to Hoquiam.
6. Tacoma, to Puyallup, to Sumner, to Stevenson, to Buckeley.
7. Seattle, to Issaquah, to Falls City, to North Bend.
8. Cooks, to Ilwaca, to Seaview, to Centerville.

DISTRIBUTION OF NATIVE FIVE-LEAF PINES.

There are three regions in Washington in which native five-leaf pines occur. These are, (1) the higher Coast Range Mountains, (2) the Cascade Mountains, (3) the northeastern corner of the state. There is, in addition, one small isolated group in the southeastern corner of the state. The principal five-leaf pine of Washington is the P. monticola. P. albicaules occurs sparsely at the higher elevation. The five-leaf pines in the Coast Ranges and Cascade Mountains are not of great commercial value. The important stands are in the northeastern section of the state in Pend Oreille and Spokane Counties. This area borders the great stand of P. monticola in northern Idaho.

DISTRIBUTION OF NATIVE RIBES.

Considerable work has been done in collecting and determining the distribution of the native species of Ribes in Washington. Collections have been made in the region west of the Cascades

and in scattered localities in eastern Washington. From this data gathered in the field, together with what information could be obtained from botanical keys and publications, 23 species of Ribes were found to be indigenous to this state.

Washington is divided from north to south by the Cascade Mountains, forming two large regions in which the climate differs considerably. This is a large factor in limiting the distribution of the various native species of Ribes.

1. Region west of Cascades - heavy rainfall, very humid, Ribes occur in this region in great abundance. A total of 13 species occur here, the most abundant being as follows:

R. cereum	R. lacustre (Parvulum)
R. laxiflorum	R. sanguineum
R. viscosissimum	R. aureum
R. americanum	R. bracteosum
G. divaricata	

2. Region east of Cascades. Little rainfall, quite dry. The Ribes in this region occur principally along the Columbia and Snake Rivers. There are a total of 16 species here, the following being the most abundant.

R. cereum	R. sanguineum
R. lacustre	R. viscosissimum
R. laxiflorum	R. aureum

R. petiolare
G. Cognata
G. Watsonianum
G. divaricata
G. irrigua

NATURAL BARRIERS TO THE WHITE PINE BLISTER RUST.

There is probably no region in Washington which would constitute an efficient barrier to the spread of the White Pine Blister Rust. The only portion of the state which could possibly be considered as such is the central eastern region. There are no five-leaf pines indigenous in this section.. Native Ribes are found in considerable abundance along the streams. It is doubtful if the winters are severe enough to prevent the disease from living over. Furthermore, any infection coming into this region would have an unbroken chain of five-leaf pines through the northern part of the state, and leading in one direction to the main forests of the western mountains, and in the other to the forests of Idaho and Montana. Thus, the belt of five-leaf pines in the northern part of the state would enable the disease to travel either east or west, from a point of infection. Once established in the Cascade Mountains, it could readily travel southward through the forests of Oregon and California.

REGIONS WHERE WHITE PINE BLISTER RUST MAY HAVE BEEN INTRODUCED.

An examination of the card records of Washington for both

Ribes and five-leaf pines shows that the greatest number of plantings have been made in two regions. These would naturally be regarded with the greatest suspicion, in regard to the introduction of the White Pine Blister Rust. The first of these regions constitutes the counties lying between Puget Sound and the summit of the Cascade Mountains. The second is the eastern and northwestern part of the state.

Relation to Five-Leaf Pine Forests: The first of these regions lies within or immediately adjacent to the main five-leaf pine belt of the Cascade Mountains. The introduction of White Pine Blister Rust into this region, unless immediately discovered and stamped out, would undoubtedly lead to the wide spread infection of these forests.

The region in eastern Washington with the exception of Whitman County, lies within or immediately adjacent to the P. monticola forests of the northern part of the state, and of northern Idaho. Whitman County lies south of this pine belt. It is well isolated from five-leaf pines. Introduction of the disease into this county would probably not be very serious.

RECOMMENDATIONS FOR FUTURE WORK.

The most important work for the future in Washington undoubtedly consists in a thorough scouting of both pines and Ribes, in the five-leaf pine belt. This would reveal the presence of any infection,

and would give the needed data on the distribution of native Ribes in these regions.

Further inspection of planted pines and Ribes should be made in eastern Washington. The wild Ribes there should be scouted, and notes made on the distribution of the various species.

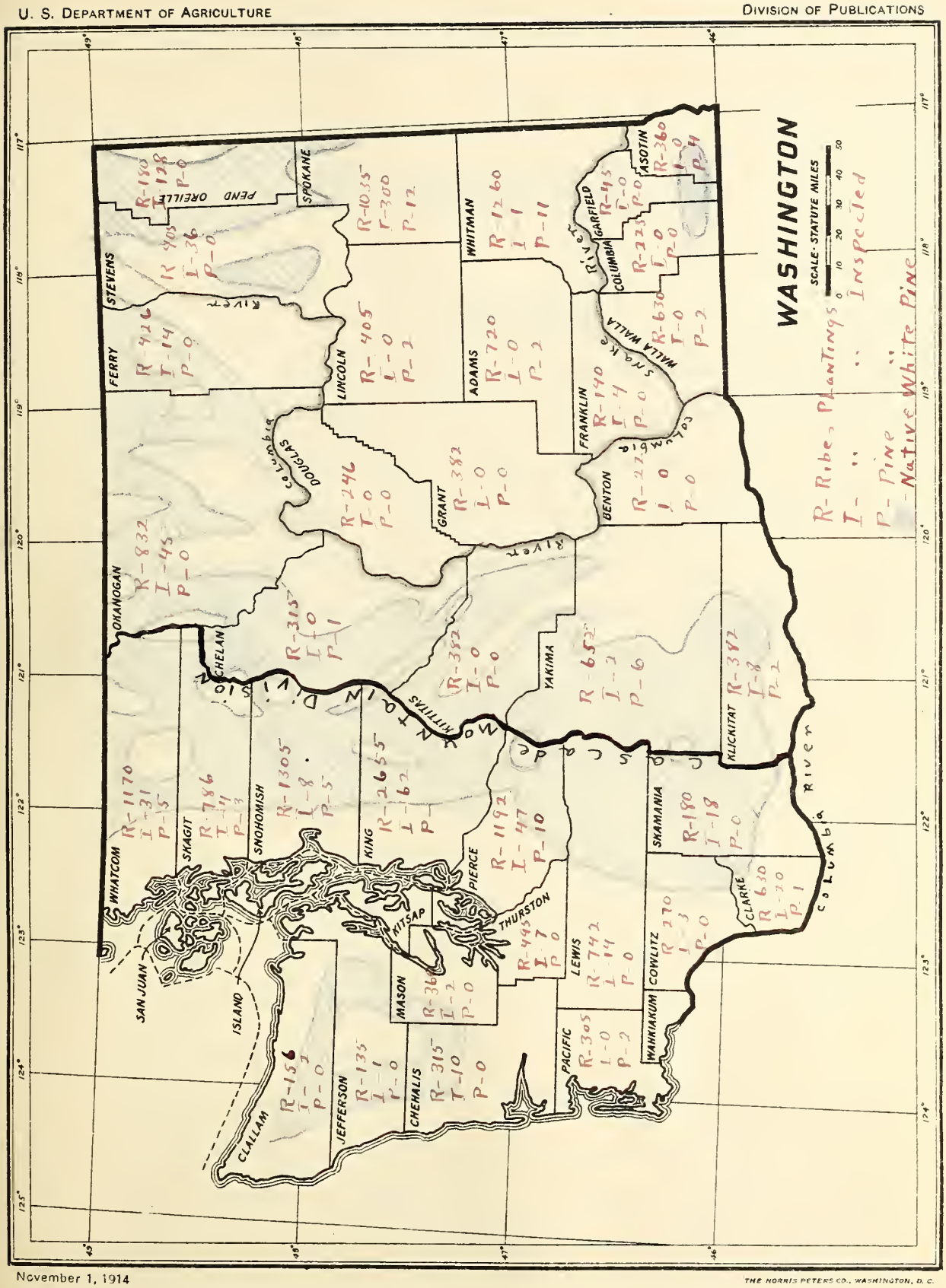
For educational purposes, blister rust exhibits should be made in the state University at Seattle, Washington, Agricultural College at Pullman, Washington, and the Spokane and Yakima fairs and state museums at Seattle, Washington.

Riker mounts should be provided for the county inspectors, in order to familiarize them with the disease.

RECORD OF PLANTINGS AND INSPECTIONS,,1917-1919

	RIBES					PINES				
	Plantings Inspected				Cards on	Cards on	Number of	Plantings Inspected		
Counties	1917	1918	1919	Total	File	File	Pine	1917	1918	1919
Adams					720	2	8		1	2
Asotin					360	4	133	1	2	4
Benton					22					
Chelan					315	1	2		1	
Clallam		2		2	156					
Clarke		20		20	630	1	1		1	1
Columbia					225					
Cowlitz		3		3	270					
Douglas					246					
Franklin		4		4	190					
Ferry			14	14	426					
Garfield					45					
Grant					382					
Grays Harbor		2	10	12	562					
Island					292					
Jefferson		1		1	135					
King		47	15	62	2655	22	356	15	20	22
Kitsap					450					
Kittitas					382					
Klickitat			8	8	382	2	105			2
Lewis		11	3	14	742					
Lincoln					405	2	51			2
Mason		2		2	360					
Okanogan		45		45	832					
Pacific					305	2	11	1		2
Pend Oreille		128		128	180					
Pierce		23	24	47	1192	10	46	6	8	8
San Juan					180					
Skagit		1	3	4	386	3	39	1	3	1
Skamina			18	18	180					
Snohomish		1	7	8	1305	5	61	4	2	5
Spokane		50	250	300	1035	12	176		11	12
Stevens		2	34	36	405					
Thurston			7	7	495					
Walla Walla					630	2	5		1	2
Whatcom		18	13	31	1170	5	113	2	3	2
Whitman		1		1	1260	11	541		5	11
Yakama		2		2	652	6	138		5	6
		363	406	769	20559	90	1786	30	63	82

No record except 190,300 Ribes inspected.



November 1, 1914

REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN OREGON.

* * * *

INTRODUCTION.

Summary of Work 1917-1918: Blister Rust work was begun in Oregon in the spring of 1917. During the seasons of 1917 and 1918, the work consisted chiefly of obtaining all available records of plantings of imported five-leaf pines and Ribes, and inspecting as many of these plantings as possible.

This information concerning importations was obtained from the following sources:

1. Custom house records.
2. Horticultural Inspectors' records.
3. Nursery invoices and sales slips.
4. Shipment records sent from the Washington office.
5. Answers to form letters of inquiry
6. Information picked up in the field.

A total of 13,676 records of Ribes shipments and 35 records of pine shipments in the state were obtained. It was found that during the past ten years, 263 nurseries have existed in Oregon. A large percent of these are now out of business. The Oregon Nursery Company at Orenco, the J. B. Pilkington Nursery at Portland, and the Milton Nursery at Milton are the chief ones still

in existence. All of the five-leaf pines handled by these three nurseries have been imported from the eastern United States, or from Europe. Of the Ribes, 63% of the sales from the Oregon Nursery, 16% from the Pilkington Nursery, and 68% from the Milton Nursery have been imported from the eastern United States or Europe. Approximately 5% of the Oregon Nursery sales, and 1% of the Milton Nursery sales were black currants.

With the object of determining whether the plantings of which we had a record were still in existence, and to locate more definitely the plantings, as well as for the educational value, form letters inquiring about the location and condition of the plants were sent to owners. Each of these was accompanied by a copy of Farmer's Bulletin No. 742. Over 4600 of these form letters were sent out.

During the seasons of 1917 all nurseries were visited, and the stock on hand inspected. 26 out of the 35 pine plantings were inspected. Considerable Ribes inspection was done, but no record of the actual number is available. During the season of 1918, 25 of the pine plantings were inspected or reinspected, and a few Ribes were inspected.

During the 1918 season a clear violation of the quarantine law was discovered. The State Horticultural Inspector at Portland, Oregon, intercepted and destroyed a shipment of nursery stock containing gooseberries and currants from Brown Brothers' Nursery Company, Rochester, New York, consigned to Mr. L.F. Coffman, Lent's Junction, Portland, Oregon.

The case was reported to the Federal Horticultural Board, according to available correspondence.

INSPECTION OF IMPORTED PLANTINGS, 1919.

Five-Leaf Pine Inspections: The work of inspection of imported plantings in Oregon for the season of 1919 was done by Mr. Morgan, Mr. Graham and Mr. Stillinger. All of the 35 known five-leaf pine plantings and two additional plantings found during the course of the work were inspected. These were located in 9 counties. The largest number, 19, were in Multnomal County.

Ribes Inspections: During the season of 1919, 146 plantings of Ribes were inspected in Oregon. These were located in 14 counties.

The accompanying table will show the number and location of the plantings and inspections for the past three years.

SCOUTING.

Scouting work for the season of 1919 was done by Mr. Morgan and Mr. Stillinger. It was largely confined to southern Oregon, this being a part of the state where native five-leaf pines are found in abundance. The following gives the regions scouted.

1. From Ashland south to the top of the Siskiyou Mountains.
2. From Medford northeast to Trail, Prospect, to Crater Lake.
3. From Grants Pass southeast to Davidson and Williams, and southwest to Holland.
4. Medford west to Jacksonville.

DISTRIBUTION OF WILD RIBES IN OREGON.

From data gathered in the field, together with information obtained from botanical publications, and herbaria, thirty species of Ribes were found to be indigenous in Oregon. Some of the indigenous species are widely distributed in many sections of the state, while others have a limited range. The abundance of Ribes plants in general is controlled by various site conditions. In some sections they occur in great profusion over large areas.

The Cascade Mountains divide Oregon into two general regions which differ quite widely as to climate. The general characteristics of these two regions are given below, with the Ribes species occurring there:

1. Western Oregon - west of the Cascade Mountains. A region of heavy rainfall, and high humidity. 23 species of Ribes occur in this region, the most abundant being as follows:

R. aureum	R. lacustre (Parvulum)
R. cereum	G. inermis
G. cruenta	G. divaricata
R. Sanguineum	R. Hallii
G. binominata	R. viscosissimum
G. lobbii	G. Klamathensis

2. Eastern Oregon - east of the Cascade Mountains: An arid region of little rainfall. 12 species of Ribes occur here, the most abundant being as follows:

R. aureum R. lacustre

R. cereum G. inermis

DISTRIBUTION OF FIVE-LEAF PINES IN OREGON.

P. monticola and P. lambertiana are the chief five-leaf pines in the state. P. flexilis occurs sparsely at higher altitudes. Practically the entire five-leaf pine range is in the Cascade Mountains, extending from Mt. Hood south to the Oregon-California line. The only commercial stand occurs in the southern part of the state. This is composed chiefly of P. lambertiana, with some P. monticola on the higher mountains.

NATURAL BARRIERS TO THE SPREAD OF WHITE PINE BLISTER RUST.

Most of the eastern part of Oregon would undoubtedly prove a barrier to the spread of the White Pine Blister Rust. There are no five-leaf pines indigenous to this region. The records of this office show only 1 planting, consisting of 9 trees, in eastern Oregon. There are twelve species of Ribes indigenous in that section, but these are largely confined to the immediate vicinity of the streams. Should these Ribes become infected with White Pine Blister Rust, the severity of the winters would very likely prevent any overwintering of the disease, in the absence of the alternate host. These factors would probably prevent the White Pine Blister Rust from crossing this region, in any direction.

REGIONS WHERE WHITE PINE BLISTER RUST MAY HAVE BEEN INTRODUCED.

An examination of the card records for Oregon shows that the great majority of both Ribes and five-leaf pine plantings have been made in the western part of the states. Nursery records show that all the five-leaf pines, and at least half of the Ribes that have been planted in this region have been imported into the state from sources considered to be dangerous. From the records, it would seem highly possible that the White Pine Blister Rust may have been introduced into this part of the state.

RELATION OF THIS AREA TO THE FIVE-LEAF PINE FORESTS OF OREGON.

This region of western Oregon lies immediately adjacent to the Cascade Mountains, where the five-leaf pines forests occur. The native Ribes are very abundant in this region, and there would be unbroken chains of Ribes leading directly to the five-leaf pine forests.

SUGGESTIONS FOR FUTURE WORK.

The larger part of the five-leaf pine and Ribes plantings in western Oregon have been inspected. This work should be completed. The most important work to be done in this region is to extensively scout the native Ribes and five-leaf pines. This would reveal any infection that might have been introduced in the

past, and would give considerable information on the distribution of the native species of Ribes.

The nurseries and pine plantings of eastern Oregon have been thoroughly inspected. The work remaining to be done in this region is to thoroughly scout the wild Ribes and to inspect the planted Ribes.

For educational purposes, blister rust exhibits should be placed in the following places: (1) State Fair, Salem, (2) Northwest Lumbermans' Convention, Portland. (3) State Museum, Portland. (4) Botany Department, University of Oregon, Eugene. (5) Forestry, Botany and Plant Pathology Departments, Oregon Agricultural College, Corvallis. (6) District Forest Service Office, Portland, Oregon. 10 Riker mounts should be provided for inspectors.

* * *

RECORD OF PLANTINGS AND INSPECTIONS, 1917-1919

	RIBES					PINES				
	Plantings Inspected				Cards on	Cards on	Number of	Plantings Inspected		
Counties	1917	1918	1919	Total	File	File	Pine	1917	1918	1919
Baker					270					
Benton					320					
Clackamas			12	12	495					
Clatsop					180	1	4	1		1
Columbia					202					
Coos			21	21	472					
Crook			13	13	246					
Curry					66					
DeSchutes					292					
Douglas			18	18	696	2	15	2		2
Gilliam					90					
Grant					112					
Harney					225					
Hood River		1	1	2	135	3	5		1	3
Jackson			17	17	336	3	7	3	3	3
Jefferson					246					
Josephine			21	21	156					
Klamath			11	11	472					
Lane			8	8	900					
Lincoln					135					
Linn					1090					
Mahheur					90					
Maman					1405	2	6	3	3	2
Marian					66					
Multnomah		2	3	5	1530	19	481	13	16	19
Polk					225	2	51	2		2
Sherman					216					
Tillamook					180					
Umatilla		1		1	742					
Union					360	1	9	1		1
Wallowa					336					
Wasco			2	2	336					
Washington					472					
Wheeler					112					
Yamhill		2		2	450	2	3	1	2	2
Lake			19	19	90					
TOTAL		6	146	152	13676	35	581	26	25	35

REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN UTAH.

* * * *

INTRODUCTION.

Summary of Work 1917-1918: Blister rust work in Utah, which was begun in the spring of 1917, consisted of collecting records concerning plantings of imported five-leaf pines and Ribes, and the inspection of these plantings. These records were obtained from (1) the Washington office, (2) invoices and sales slips of nurseries, (3) state horticultural records, (4) Form letters of inquiry, and (5) information picked up in the field. Form letter of inquiry were sent out to persons planting Ribes or five-leaf pines, to ascertain the health and the exact location of these plants. This work gives valuable data for the field men, and eliminates the inspection of many plantings.

During the seasons of 1917 and 1918, practically all of the recorded plantings of Ribes and five-leaf pines were inspected. A considerable number of card records were obtained from nurseries too late in the season of 1918 to be inspected that year. These inspections, together with scouting the native Ribes and pines, and the determination of the distribution of the species of native Ribes, constituted the work for the season of 1919.

INSPECTION OF PLANTED RIBES AND FIVE-LEAF PINES.

The blister rust work in Utah for the season of 1919 was done by Professor A. O. Garrett. Professor Garrett's work consisted largely of imspection of planted stock, with incidental scouting and the determination of the distribution of native Ribes species.

Five-Leaf Pine Inspections: There are relatively few plantings of five-leaf pines in Utah. The following inspections given by counties, were made during the season of 1919:

Cache 1.	Utah 1
Davis 1	Weber 2
Salt Lake 1	

Total, 6 inspections, in 5 counties. Total of 46 trees inspected.

Ribes Inspections: The following list gives the number of inspections of planted Ribes, made in each county of Utah, for the season of 1919:

Cache 2	Salt Lake 2
Carbon 2	Utah 2
Emery 60	Weber 1
Iron 1	

Total, 70 inspections in 7 counties. Total of 1356 plants inspected.

Form Letters: In conjunction with the inspection for Utah, form letters of inquiry were sent out from the Berkeley office, to persons who had planted five-leaf pines or Ribes. Each letter contained a copy of Farmer's Bulletin No. 742, and a reply form. During the season of 1919, 1835 of these letters were sent out to persons in Utah. 222, or 12.1% have been answered to date.

SCOUTING.

In conjunction with the inspection work, Professor Garrett scouted the wild Ribes and pines, and made determinations on the distribution of the native Ribes species. No Cronartium infection was found on Ribes, nor any peridermium on five-leaf pines.

Host Plants: Pines: P. flexilis is the most important five-leaf pine in Utah, occurring in small areas all over the state. There is one small group of P. albicaulis, near the Great Salt Lake. P. aristata occurs in isolated groups in the central a and southern part of Utah.

Ribes: The species of Ribes occurring in greatest abundance in Utah are as follows:

R. aureum	R. Wolfii
R. inebrians	G. inermis
R. montigenum	G. leptantha
R. viscosissimum	

Other species, occurring in less abundance, are given below:

R. americanum
R. cereum
R. coloradense
R. glandulosum
R. lacustre
R. odoratum
R. petiolare
G. velutina.

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A REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN ARIZONA.

* * * * *

INTRODUCTION.

Blister Rust work in Arizona for the past three years has been done by Mr. Leslie N. Goodding. It has consisted of scouting Ribes, both native and introduced, inspecting pines and Ribes for blister rust, determining the distribution of the different species of Ribes, and endeavoring to foster a spirit of cooperation with the state officials, who are directly responsible for the enforcement of the quarantine laws.

The nursery inspection cards in the office of the State Entomologist up to 1917 proved to be of very little value. Many had been destroyed and those remaining were mostly illegible. The card records sent out from Washington of shipments into the state served to locate the general localities into which such plants were being shipped, but a vast part of the shipments were located by general scouting. Under these conditions, the scouting on native Ribes and pines, and the scouting for planted stock were carried on simultaneously.

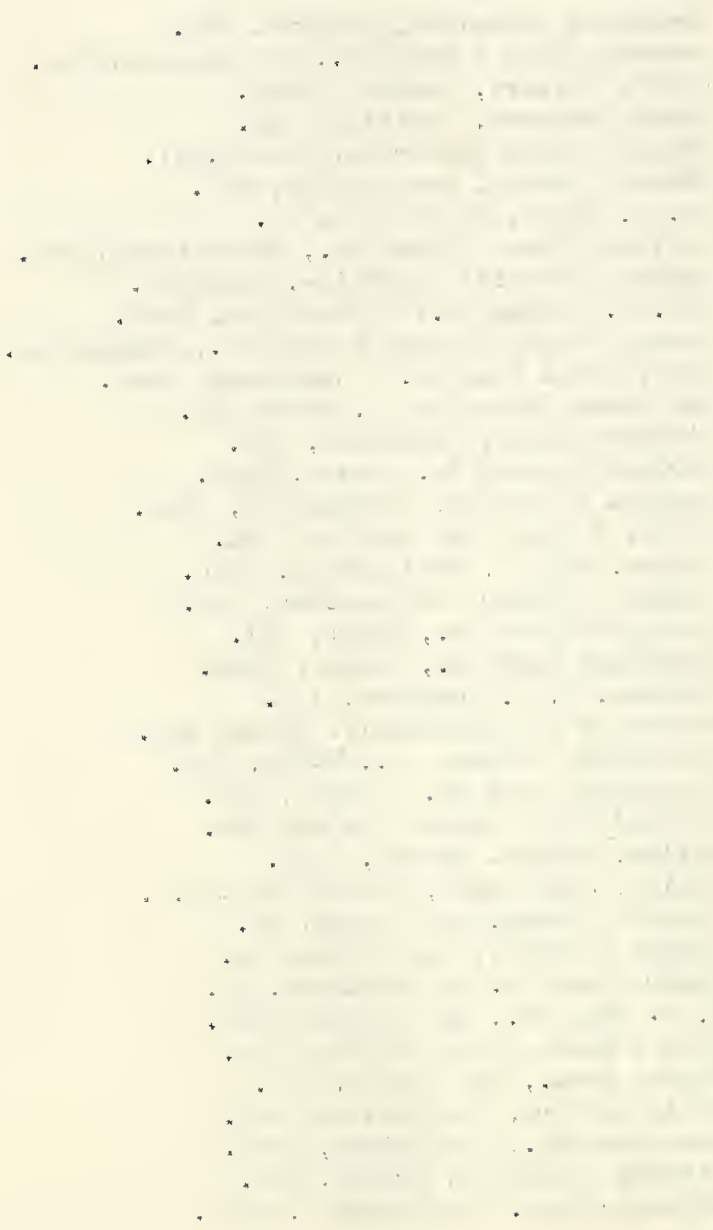
INSPECTIONS.

In no case was a nursery found in Arizona which directly handled Ribes. They receive very few orders for Ribes, and these

few they turn over to other nurseries, outside of the state.

The principal nurseries and seed houses doing business in Arizona are:

Armstrong Nurseries, Ontario, Cal.
Germain Plant & Seed Co., Los Angeles, Cal.
Austin Nursery, Austin, Texas.
Stark Brothers, Louisiana, Mo.
Fancher Creek Nurseries, Fresno,Cal.
Howard & Smith, Los Angeles, Cal.
Sm. P. Stark, Stark City, Mo.
American Rose & Plant Co., Springfield,Ohio.
German Nurseries, Beatrice, Nebraska.
Geo. H. Mellen,Co., Springfield, Ohio.
Orange County Nursery & Land Co.,Anaheim,Cal.
Henry Field Seed Co., Shenandoah, Iowa.
New Haven Nurseries, N. Haven, Mo.
Pioneer Nursery, Monrovia, Cal.
Gardner Nursery Co., Osage, Iowa.
Schmidt & Bottley, Springfield, Ohio.
Morris & Snow, Los Angeles, Cal.
Baines, Ella V. Springfield, Ohio.
Aggler & Musser, Los Angeles, Cal.
American Plant Co., Hemet, Cal.
Barteldes Seed Co., Denver, Colo.
Buckbee, H. W. Rockford, Ill.
Bureau of Plant Industry, Chico, Cal.
California Nursery Co., Niles, Cal.
California Rose Co., Pomona, Cal.
Capital City Nursery, Salem, Ore.
Cullen, Martin, Denver, Colo.
Childs, John Lewis, Floral Park, N.Y.
Conrad & Jones, West Grove, Pa.
Dingee & Conrad, West Grove, Pa.
Dreer, Henry A. Philadelphia, Pa.
H. N. Gage Co., Los Angeles, Cal.
Good & Reese, Springfield, Ohio.
Heller Bros., New Castle, Ind.
Hills Nursery, Los Angeles, Cal.
Iowa Seed Co., Des Moines, Iowa.
Kirkman Nurseries, Fresno, Cal.
McGregor Bros., Springfield, Ohio.

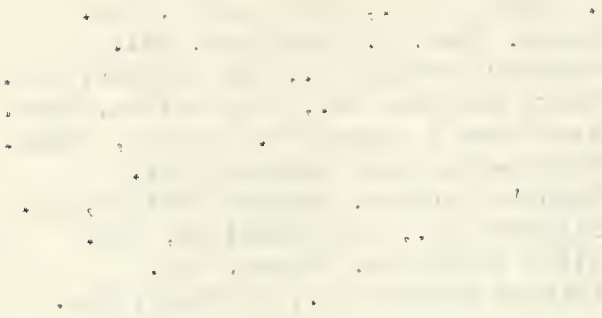


S. Murata & Co., Los Angeles, Cal.
Navlet, Chas. C., San Jose, Cal.
Superior Nursery Co., Los Angeles, Cal.
Storrs Harrison Co., Painesville, Ohio.
Texas Seed & Floral Co., Dallas, Texas.
Vallance Nursery, Oakland, Cal.
Vaughn's Nursery, Western Springs, Ill.
Willbanks Co., San Francisco, Cal.
Willis Nurseries, Ottawa, Kan.
Winfield Nursery Co., Winfield, Kan.

There are also about seventy nurseries, seed, or floral houses, of varying importance, which have done business in Prescott during the past two years. These are located in Arizona, Arkansas, California, Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Massachusetts, Michigan, Missouri, Minnesota, Nebraska, New York, New Jersey, Ohio, Oregon, Pennsylvania, South Dakota and Texas. This is merely to give an idea of the vast possibility for the introduction of the disease. Of course, the total number of nurseries and states represented in the entire state is much greater. The ninth annual report for 1916 and 1917 of the Commission of Agriculture and Horticulture reports nursery stock introduced into the state from four hundred and ninety sources, and thirty-eight different states.

SCOUTING.

Method of Scouting: Scouting in Arizona was carried on by whatever means found most feasible. In many cases travelling was done by railroad and the scouting done on foot. To reach points



inaccessible by railroad, automobiles were hired, and in some instances a saddle horse, pack horses, and camping outfit were rented.

The following territory was scouted in Arizona:

1. Lower portion of Colorado River Canyon, and the Virgin River region, in the northwestern corner of Mohave County.
2. Region from Kingman to Peach Springs, and south through the Hualpai and Aquarino Mountains.
3. From Grand Canyon southwest along the Little Colorado River to Springerville.
4. The Ashfork, Williams, and Flagstaff region, and south through Clarkdale, Jerome, Prescott, Hillside, and Wickenburg. Southwest from Flagstaff along Mogollon Mesa to Springerville.
5. The Yuma region.
6. The Phoenix region and south to Maricopa. East from Phoenix along Salt River, to the Roosevelt Lake region.
7. South from Springerville to Clifton and Safford.
8. Southwest from Springerville to Globe,

Florence, Winkleman and Casa Grande.

9. All of Cochise County, and eastern Pima County.

This comprises practically all of the state of Arizona except the region north of the Colorado and Little Colorado Rivers, and the southwestern desert.

In 1917, Messrs. Long, Bethel, Hunt, Hedgecock and Lewellyn of the Office of Forest Pathology did considerable scouting in Arizona for the pinon blister rust. The Cronartium stage of this disease was found on Ribes in the Prescott region, and along the Verde River.

DISTRIBUTION OF FIVE-LEAF PINES.

The five-leaf pines occurring in Arizona are as follows: P. arizonica in the southern part of the state (P.arizonica is not regarded as a blister rust host.) P. flexilis, in the mountains at altitudes above 7000 feet. P. strobiformis in southeastern Arizona. One group of P. aristata in Central Arizona.

DISTRIBUTION OF RIBES.

Considerable work has been done on the distribution of the native Ribes of Arizona. This information has been obtained from field observation, a study of the herbarium of the University of Arizona, and from the North American Flora. Maps have been prepared, showing the distribution of each species of Ribes in

the state.

The Ribes species occurring in greatest abundance in Arizona are as follows:

R. aureum

R. inebrians

G. pinetorum

G. leptantha

The following species occur in the state, but in less abundance.

R. americanum

R. cereum

R. montigenum

G. velutina

R. Wolfii

NATURAL BARRIERS TO WHITE PINE BLISTER RUST.

Climatic conditions, and the distribution of the white pines and Ribes show that Arizona, taken as a whole, offers a barrier to the spread of the white pine blister rust from the east. The southwest and western portions of the state are too dry and hot for either white pines or Ribes. The basin of the Colorado River might offer a possible avenue of entry. G. velutina occurs all along the river and the rim of the canyon. If this species proved to be a congenial host, the disease could travel along the river.

But the California and Nevada deserts would probably prove a barrier to further westward progress.

AREAS OF THE STATE IN WHICH RIBES ARE GROWN.

Some localities are peculiarly adapted to the growth of small fruits, and these are the places into which Ribes have been introduced most extensively. It was found that many shipments of gooseberries and some of currants had been made into Navajo and Apache Counties, and likewise into Prescott and the country immediately surrounding it. The first named localities might offer an excellent opportunity for the introduction of the white pine blister rust, as there are abundant Ribes along the streams leading from the mountains, and white pines are common at higher altitudes. There are no white pines in Prescott or the mountains surrounding it. Some of the southern ranges offer even a better opportunity for the introduction of the disease, as the Mexican white pine, P. strobiformis, grows at relatively low altitudes. But in few cases could it be learned that Ribes had been introduced into these regions. The isolation of these southern ranges would make the introduction of the disease of but little importance.

POSSIBLE AVENUES OF ENTRANCE OF WHITE PINE BLISTER RUST.

There are three potentially dangerous avenues of entrance for the white pine blister rust into Arizona. These are:

1. Parcel post shipments of Ribes from eastern nurseries, in violation of the quarantine.
2. Ribes "thrown" in on a nursery order.
3. Shipment of Ribes cuttings from the eastern states by friends or relatives of persons now in Arizona.

These three dangers could largely be eliminated by further educational work among both the people of the state, and the horticulture inspector.

QUARANTINE VIOLATIONS.

Violations of the quarantine laws have been reported from time to time. One that is worthy of mention was the introduction by Karns Brothers of Nogales of several dozen white pine from Storrs and Harrison, Painesville, Ohio, and a Georgia nursery. The species were P. Strobus and P. excelsa. Several other cases, all of introduction of Ribes, were reported at the time. In most cases the information obtainable was very meager.

SUGGESTIONS FOR FUTURE WORK.

In future blister rust work in Arizona, a greater degree of cooperation with the local authorities should be affected. The enforcement of the quarantine laws devolves largely on the state authorities. The quarantine is of great importance in Arizona, where such a large proportion of the nursery stock is imported from other states. A proper appreciation of the situation

by postmasters would help greatly in detecting any parcel post shipments of Ribes. The fostering of a friendly spirit between the blister rust men and the nurserymen would also bring good results.

Much good can be accomplished by visiting the crop inspectors in different sections of the state, and in having friendly chats with them. It has been found that many of them are busy men, and are poorly equipped for the work that they are doing. A little talk regarding the nature of the blister rust and the quarantine laws usually makes them much more alert on this point.

General educational work should also be done in Arizona. If the blister rust men at work there could occassionally address public meetings, the general public would understand the situation in regard to the disease much better. At present there is a tendency all over the west to regard blister rust as an eastern problem, and not one to be necessarily considered here.

Further and more accurate data should be collected on the distribution of the native Ribes species of Arizona. The distribution of those species already recognized as occurring here can be further determined. It is also probable that other species would be found in the state.

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N E V A D A

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INTRODUCTION.

Summary of Work 1917-1918: A large part of the state of Nevada had been scouted prior to the season of 1919. Much of this was done before the card records for the state were obtained. The plantings were found by actual field scouting. In this way the major portion of the Ribes and five-leaf pine plantings had been inspected.

INSPECTION OF PLANTED RIBES AND FIVE-LEAF PINES.

During the season of 1919, Professor A. O. Garrett inspected all the plantings of five-leaf pines in Nevada of which the central office had records. There were very few in number, being located as follows:

University of Nevada, Reno, Washoe County.

Dayton, Washoe County.

Paradise Valley, Humboldt County.

Form Letters: Form letters of inquiry were sent to parties in Nevada who had plantings of pines and Ribes. These letters were sent out from the Berkeley Office. 234 of these

form letters were sent out. To date, 43 replies or 18.33% have been received.

SCOUTING IN NEVADA.

A portion of western Nevada, near Carter's Station and Minden, was scouted by the field crew working in the Sierra Nevada Mountains of California, and later by Mr. Posey. Heavy infections of a Cronartium were found on G. velutina and R. aureum. This was closely associated with a peridermium on P. monophylla. A more detailed discussion of these infections will be found in the California report.

Host Plants: Pines. P. lambertiana, P. monticola, and P. albicaulis occur to a very limited extent in western Nevada. P. flexilis occurs over a considerable area in southern and eastern Nevada. P. aristata also occurs in isolated groups in eastern and southern Nevada.

Ribes: The species of Ribes occurring in greatest abundance in Nevada are as follows:

R. americanum

R. aureum

R. cereum

R. inebrians

R. montigenum

R. nevadense

G. velutina

The other indigenous species, which occur in less abundance are:

R. fontinale

R. Hallii

R. pumilum

G. inermis

G. lasiantha

G. Roezli

G. nivea

TERRITORY WHERE WHITE PINE BLISTER RUST MAY HAVE BEEN INTRODUCED.

The central western portion of Nevada in the vicinity of Reno and Carson City should be considered as the only potentially dangerous region for the introduction of the White Pine Blister Rust. This is the most densely populated part of the state, and the part in which the greatest number of pine and Ribes plantings have been made. The small areas of P. lambertiana, P. monticola, and P. albicaulis constitute direct leads to the main five-leaf pine belt of California. Thus, the introduction of the disease here would doubtless lead to the infection of the P. lambertiana forests of California.

SUGGESTIONS FOR FUTURE WORK.

The distribution of the Cronartium occurring on Ribes in Nevada should be determined. If, as it appears at present, its

alternate host is P. monophylla, it will doubtless be found to occur very widely over the state, as P. monophylla is found more abundantly in Nevada than any other pine. A knowledge of the distribution of this Cronartium would be necessary in case white pine blister rust were found.

Further work should be done on determining the distribution of native species of Ribes. A knowledge of the distribution of all Ribes species would be necessary in the event that White Pine Blister Rust were discovered.

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REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN WYOMING.

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INTRODUCTION.

Summary of Work, 1917-1918: Blister Rust work in Wyoming, begun in 1917, consisted for the first two seasons in the collection of records of imported Ribes and five-leaf pine, and inspection of these plantings. The following are the sources of this information:

1. State horticultural records.
2. Records from the Washington office.
3. Records from nurseries in other states.
4. Information gathered in the field.

Only two nurseries have been found in Wyoming. Nursery stock is practically all imported, 31 nurseries having shipped pine or Ribes stock into the state, 15 of these being located in the East. A total of 1068 Ribes plantings, and 4 five-leaf pine plantings have been recorded from the above sources.

During the seasons of 1917 and 1918, 184 inspections of Ribes and two inspections of pines were made. Some scouting was done in these seasons, but no exact record of this work is available.

WORK FOR SEASON OF 1919.

Because of the small relative importance of Wyoming, no inspection work was done there for the season of 1919. Some scouting was done in the northwestern part of the state by Mr. Posey, Mr. Stillinger, and Mr. Prentice. The country from Yellowstone, to Mt. Washburn, to Gardner was scouted.

DISTRIBUTION OF WILD RIBES.

15 species of Ribes are indigenous in Wyoming. These are found principally in the forested regions in the northwestern part of the state. R. lacustre, R. petiolare, and R. viscosissimum are the species found most abundantly. R. cereum, R. inebrians, R. montigenum and G. inermis are found in the northwestern part of the state, and also along the streams in other parts.

DISTRIBUTION OF NATIVE FIVE-LEAF PINES.

The chief five-leaf pines of Wyoming are P. flexilis and P. albicaulis. They occur in the mountainous region in the northwestern part of the state. There is a little P. flexilis along the southern border. The remainder of the state consists of rolling valleys and sage brush hills.

BARRIERS TO WHITE PINE BLISTER RUST.

All of Wyoming except the mountainous regions of the northwestern part, and to some extent the portion along the southern border

would prove a barrier to the White Pine Blister Rust. No five-leaf pines are indigenous in the central portion, and the winters are too severe to allow the fungus to live over on the Ribes host.

REGIONS WHERE THE WHITE PINE BLISTER RUST MAY HAVE BEEN INTRODUCED.

An examination of the card records show that the plantings of imported Ribes and five-leaf pine have been made along the two main railroads which traverse the state. If the White Pine Blister Rust were introduced into either of these regions it would probably be able to establish itself in the forests of Idaho or Utah.

RECOMMENDATIONS FOR FUTURE WORK.

The native Ribes and five-leaf pines of the northwestern part of the state should be thoroughly scouted, and the distribution of the species determined.

Form letters, accompanied by a copy of Farmer's Bulletin No. 742 should be sent out to all persons having plantings of imported Ribes or five-leaf pines.

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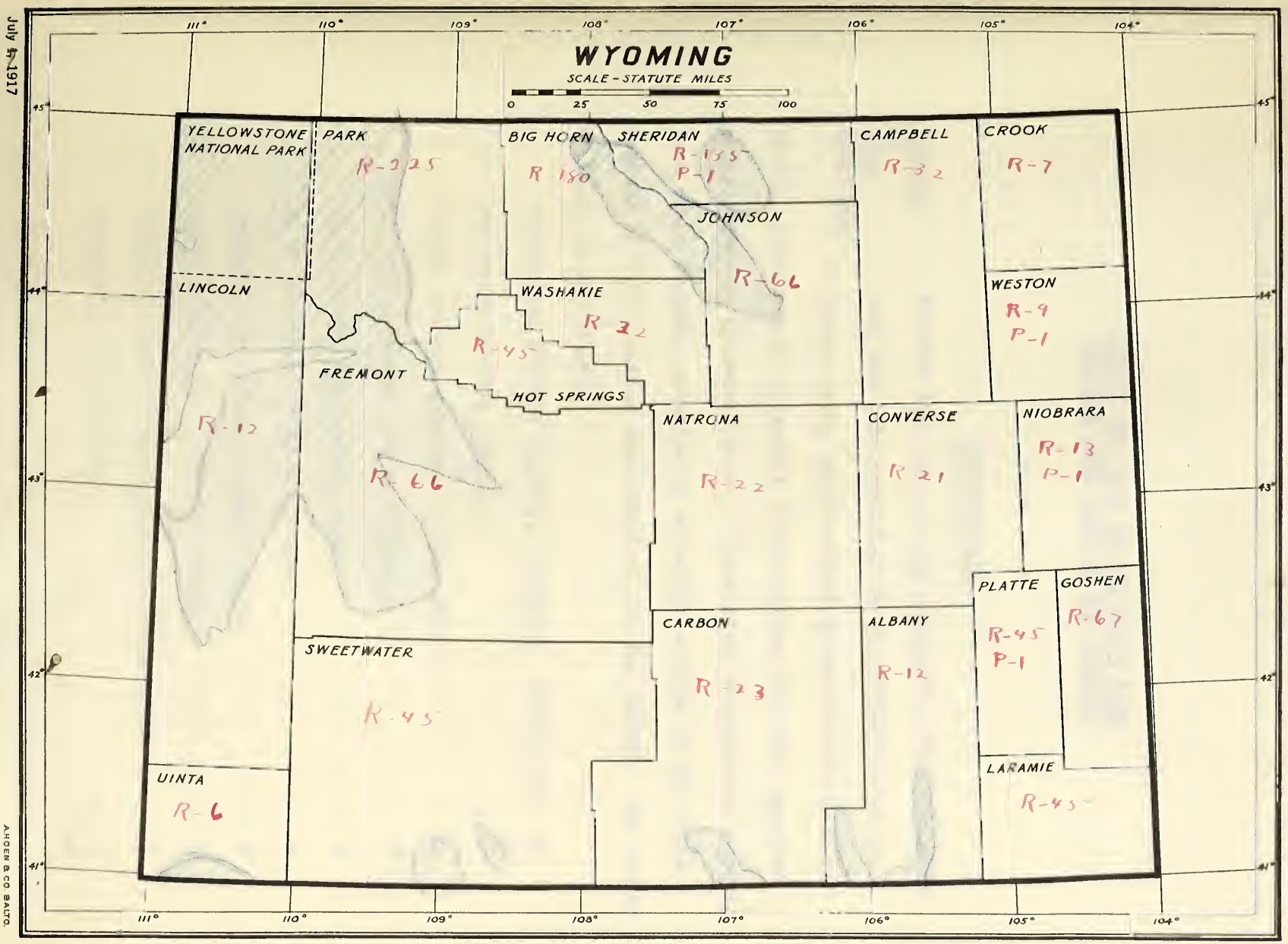
RECORD OF PLANTINGS AND INSPECTIONS, 1917-1919.

	RIBES									
	Plantings Inspected				Cards on	Cards on	Number of	Plantings Inspected		
Counties	1917	1918	1918	Total	File	File	Pine	1917	1918	1919
Albany					12					
Big Horn					180					
Campbell					22					
Carbon					23					
Converse					21					
Crook					7					
Fremont					66					
Goshen					67					
Hot Springs					45					
Johnson					66					
Laramie					45					
Lincoln					12					
Natrona					22					
Niobrara					13	1	6			1
Park					225					
Platte					45	1	6	1		
Sheridan					135	1	10	1		
Sweetwater					45					
Vinta					6					
Washakie					22					
Weston					9	1	100		1	
	184				1068	4	122	2	1	1



R- Ribes Plantings
P- Pine
" - Native White Pine

AHOEN & CO BALTO.

REPORT FOR 1919 ON THE WHITE PINE BLISTER RUST WORK IN NEW MEXICO.

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INTRODUCTION.

Summary of Work 1917-1918: Blister Rust work in New Mexico for the seasons of 1917 and 1918 consisted in the inspection of imported Ribes and five-leaf pines from the card records. There are no nurseries in New Mexico that have imported either Ribes or five-leaf pines. These card records were obtained from other sources, principally nurseries outside of the state. Records of 105 plantings were obtained for New Mexico. The origin of these is as follows:

Washington Nursery Company, Toppenish, Washington	40
Toppenish Nursery Company, do	12
Oregon Nursery Company, Orenco, Oregon	25
D. Hill Nursery, Dundee, Illinois.	5
E. S. Welsh, Shenandoah, Iowa	8
C. F. Lansing, Portland, Oregon	4
Capital City Nursery, Salem, Oregon	3
L. B. Pilkington, Portland, Oregon	1
Yakima Valley Nursery, Toppenish, Washington	1
Uncertain, or from seed	7
Total	106

Of these 106 plantings, 4 were five-leaf pine, and the rest Ribes. 3 of these were inspected in 1918, and all found dead. The majority of the Ribes plantings were also inspected, during the season of 1918.

INSPECTION OF CULTIVATED RIBES AND FIVE-LEAF PINES.

The blister rust work in New Mexico for the season of 1919 consisted largely of the inspection of cultivated Ribes. Mr. Auxier, performing this work, made a total of 57 inspections in 30 localities, and in 17 counties, as follows:

Inspections according to counties.

Quay	- 5	Eddy	- 6
Colfax	-10	Roosevelt	- 1
San Miguel	- 3	Otero	- 1
San Juan	- 1	Dona Ana	- 9
Taos	- 5	Sierra	- 1
Socorro	- 2	Valencia	- 2
Grant	- 1	McKinley	- 5
Luna	- 1	Santa Fe	- 2
Lincoln	- 2		

These were all inspections of Ribes, with the exception of one planting of five-leaf pine, in San Juan County. This pine planting was found to be dead.

SCOUTING

Inspections of wild Ribes and native five-leaf pines were

made in conjunction with the inspections of planted stock.

DISTRIBUTION OF NATIVE FIVE-LEAF PINES.

P. flexilis occurs in scattered groups in the mountains of New Mexico. P. strobiformis is found in the southern and western part of the state. There is a little P. aristata in northern New Mexico.

DISTRIBUTION OF NATIVE RIBES.

The following species of Ribes occur:

R. inebrians
R. aureum
R. wolfii
R. americanum
R. cereum
R. lacustre
R. messalerium
G. pinetorum
G. leptantha.
R. montigenum
G. inermis
G. irrigua